



GLASS FOR CONSTRUCTION

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LIBBEY • OWENS • FORD

1955

Parallel-O-Plate

Made by L-O-F's New Twin-Ground Process



The perfection of the new L-O-F Polished Plate Glass is achieved by the twin-grinding process, used in the United States only by L-O-F. Both sides of the glass are ground simultaneously by extremely accurate grinders weighing over 5 tons each. This produces uniformity of thickness far superior to regular

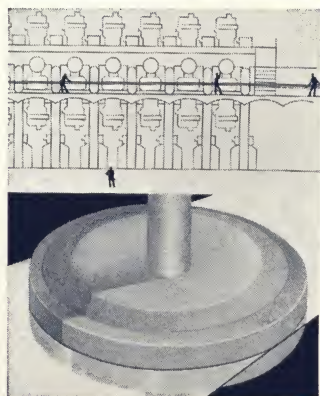


plate glass, and surfaces that are parallel to a degree never achieved by any other method. These two characteristics combine to make this glass superior to any other type of Polished Plate Glass. Parallel-O-Plate is available in 1/4" thickness only.

Silvering and mirror glazing quality polished plate glass is

used for the finest mirrors and for high quality glazing in residences. Glazing quality polished plate

glass is used for general glazing purposes.

1/8"—Small panes, mirrors, etc.

1/4"—Windows of public and office buildings, residences and apartment buildings, mirrors, storefronts, show cases, shelving, table and desk tops.

1/2"—Long shelves, glass furniture, background for decoration, etc.

1/2" to 1 1/4"—Aquarium tanks, glass furniture, table and desk tops, etc.

Color Clear® Plate Glass

Exceptionally clear and colorless, it shows the true color of merchandise behind it.

Color Clear polished plate glass is ideal for Picture Windows, commercial refrigerator cases and mirrors.

Tuf-flex tempered Color Clear polished plate glass (pages 6 and 7) is supplied in 1/4" thickness.

Colored Polished Plate Glass

Libbey-Owens-Ford produces polished plate glass in the following colors: blue, peach and golden. Coloring is uniformly controlled. These glasses can be used for glazing purposes. They are also highly recommended for mirrors and decorative applications. Colored polished plate glass is furnished in glazing quality only.

Colored polished plate glass may be heat treated for greater strength (see Tuf-flex pages 6 and 7).

Golden Polished Plate Glass

Libbey-Owens-Ford Golden Polished Plate Glass is a product of special chemical composition, light gold in color.

Golden Polished Plate Glass excludes approximately 99.7% of the ultraviolet rays in average sunlight. Ultraviolet rays are responsible for more fading of more dyed materials than any other part of the energy in sunlight. This does not mean that Golden Polished Plate Glass will reduce fading by 99.7% or that it will prevent fading of all colors.

Some fading of dyed materials displayed in the sunlight behind the Golden Polished Plate Glass store front window may be expected; the amount of fading depends on the duration of the exposure and the light fastness of the dye used. Fading may result from solar radiations, other than the ultraviolet, which are not excluded by Golden Polished Plate Glass. Golden Polished Plate Glass will reduce fading compared to regular polished plate glass only where the circumstances and location of the installation are identical.

Some colors are enhanced by the golden color of the glass. Others may be color-corrected by using illumination combining known percentages of fluorescent lighting and daylight lighting.

Heat Absorbing Polished Plate Glass

L-O-F Heat Absorbing Polished Plate Glass is a product of special chemical composition, pale bluish green in color, and made to absorb a high percentage of the total radiant energy of the sun. Part of the absorbed heat is subsequently transferred to the interior, but a considerable portion is given off to the exterior, effecting a net reduction of the solar heat entering through the glass.

Qualities

L-O-F Heat Absorbing Polished Plate Glass 1/4" thick transmits 46.8% of the total solar radiation as compared with a transmission of 82.3% afforded by regular plate glass 1/4" thick. The resulting reduction of solar heat transmission will produce a cooler atmosphere inside, resulting in lower initial cost for the air conditioning equipment and its cost of operation. L-O-F Heat Absorbing Polished Plate Glass reduces sun and sky glare and provides light which is restful to the eyes.

Regular, Color Clear, Colored, Golden Polished Plate Glass and Heat Absorbing Polished Plate Glass are described in detail on this page. Page 4 has information regarding the use of Polished Plate Glass for regular and Mirropane Transparent Mirrors. Page 6 has data regarding Tuf-flex (Heat Tempered) Polished Plate Glass, including doors. Safety Glass and Bullet Resisting Plate Glass are described on page 8. For bent plate, see pages 16-17.

Suggested Specifications

Plate glass shall be Libbey-Owens-Ford (.....) polished plate glass and shall be of (.....) quality and (.....) thickness as defined by Federal Specification DD-G-451a.

Chart for Specifying L-O-F Polished Plate Glass

Type or Color	Thick-ness	Thick-ness Toler-ance	Standard Maximum Width and Length	Maximum Size Special Order	Approx. Weight Lbs. Per Sq. Ft.	Average Solar Radiation Transmittance Values At Normal Incidence			Tuf-flex (Heat Tempered)	
						Ultra-violet	Illuminant C (Average Daylight)	Total Solar Radiation*	Minimum Width	Maximum Size
Regular	1/8"	±1/32"	72" x 74"	74" x 120"	1.64	77.4	90.9	86.8	2"	72" x 120"
	1/4"		120" x 170"	120" x 252"	3.27	70.8	90.0	82.3		
	3/8"		90" x 130"	120" x 192"	4.90	72.1	89.8	85.0		
	1/2"	±3/64"	90" x 130"	108" x 168"	6.54	68.9	89.5	83.2	2"	56" x 120"
	5/8"		72" x 120"	90" x 132"	8.17	66.0	88.9	81.4		
	3/4"		72" x 120"	90" x 132"	9.81	63.2	88.4	79.5		
	7/8"	±1/16"	42" x 96"	48" x 108"	11.44	60.8	87.9	77.7	2"	40" x 100"
	1"		42" x 96"	48" x 108"	13.08	58.9	87.4	76.1		
	1 1/4"		42" x 96"	48" x 108"	16.25	55.0	86.4	73.0		
	1 1/2"									
Heat Absorbing	1/4"	±1/32"	84" x 120"	96" x 138"	3.27	45.9	78.6	46.8	2"	72" x 120"
Color Clear	1/8"	±1/32"	40" x 80"	55" x 90"	1.64	84.4	91.6	91.3	2"	72" x 120"
	1/4"		72" x 120"	90" x 132"	3.27	81.9	91.5	90.8		
Peach	3/32"	±1/32"	72" x 120"	90" x 132"	2.86	55.3	80.9	78.4	2"	48" x 72"
Golden	1/4"	±1/32"	72" x 120"	90" x 132"	3.27	0.3	81.7	78.1	2"	72" x 120"
Blue	3/32"	±1/32"	72" x 120"	90" x 132"	2.86	78.6	58.6	75.7	2"	48" x 72"

*Solar radiation values are normal incidence transmittances for source that has energy distribution of the sun at 30° altitude (air mass equals two)(approximately 10% ultraviolet, 40% visible rays, 50% infrared.)

Uses

Glazing of storefronts and display windows to reduce fading by sunlight of merchandise, glazing of windows to reduce glare, in display cases to cover important documents, fabrics, prints and valuable papers which might become obliterated by fading in sunlight.

Another use of Golden Polished Plate Glass is in the manufacture of mirrors. Mirrors made with this light golden-colored glass have a rich, warm tone which adds a touch of distinction, regardless of where they are used.

Suggested Specifications

Plate glass shall be Libbey-Owens-Ford Golden Polished Plate Glass 1/4" thick glazing quality as defined by Federal Specification DD-G-451a.

For Specifying Golden Plate

Physical properties: Not measurably affected by time and light or weather exposure. See table above for specification data. See pages 6 and 7 for use of Tuf-flex made with Golden Plate.

Uses

L-O-F Heat Absorbing Polished Plate Glass is particularly suited for glazing the windows of office and apartment buildings, hospitals, schools, factories, and other types of buildings where the reduction of solar heat is desired and where visibility is essential. Merchants whose wares are perishable will find Libbey-Owens-Ford Heat Absorbing Polished Plate Glass beneficial for show windows. Because of its heat absorbing characteristics, this glass helps protect merchandise such as fruits, vegetables, candy, and flowers by keeping them fresh much longer.

Suggested Specifications

Plate glass shall be Libbey-Owens-Ford Heat Absorbing Polished Plate Glass 1/4" thick glazing quality as defined by Federal Specification DD-G-451a.

For Specifying Heat Absorbing

See table above for specification data. See pages 6 and 7 for use of Tuf-flex made with Heat Absorbing. For use of Heat Absorbing as outside light in Thermopane, see page 15.



Mirrors of Parallel-O-Plate



Mirrors made from L-O-F Twin-Ground Polished Parallel-O-Plate provide an exactness of image and sparkling clarity that excels any mirrors available in the past.

Libbey-Owens-Ford Glass Company does not manufacture and sell chemically deposited mirrors for architectural purposes, but supplies polished plate glass to many of the leading mirror manufacturers.

Mirrors are playing an increasingly important part in modern decoration and design. Architects and designers have found that mirrors bring increased light, beauty, sparkle and spaciousness into residences, hotels, apartment houses, stores, offices and public buildings.

An excellent use of mirrors is to double the apparent size of a room or space by facing one wall or two adjoining walls with large mirror sections, attached with rosettes or mastic. To create this illusion the room must be designed as a half or a quarter of a room so that important features occur at the intersection of mirror-to-wall, mirror-to-ceiling or mirror-to-mirror.

Circular mirrors for dining rooms, fireplace-to-ceiling mirrors for living rooms, full length polished plate glass mirrors for bedrooms and dressing rooms, built-in mirrors for smart powder rooms—all aid in introducing charm and dignity into modern homes.

Commercial uses for mirrors are wide and varied—modern department stores and showrooms use large areas of mirrored surfaces for background effects, triple mirrors in clothing sections, overhead mirrors for decorative purposes. Mirrored walls and ceilings are used extensively in bars, restaurants, clubs, theaters, etc. and add decorative beauty and feeling of spaciousness where space is limited.

Qualities

Mirrors are graded according to the quality of polished plate glass used. "A"—(Silvering Quality) used only for the finest mirrors. No. 1 (Mirror Glazing Quality) used for all types of selected mirrors. No. 2 (Glazing Quality) used for all other polished plate glass mirrors which are termed "commercial" mirrors.

These standards correspond to those established by the Department of Commerce through the National Bureau of Standards as Commercial Standard CS27-36.

Specify L-O-F Polished Parallel-O-Plate Glass for mirrors to insure the finest glass quality.

Mirropane[®] Transparent Mirrors

Durability and long service performance are outstanding qualities of L-O-F Mirropane—an L-O-F product using evaporated chromium alloy for "One-Way Mirror" installations.

With a light transmission of approximately 8% \pm 3% and a light reflection from the reflective side of about 50% \pm 5% the specially treated glass when properly installed serves as a mirror from the front, but is transparent when viewed from the back. For example:

When L-O-F Mirropane is installed between two rooms one of which is brightly lighted and the other dimly lighted, an observer in the dark room can see into the lighted one, but the glass has the appearance of an opaque mirror in the illuminated room. The perfection of the performance is governed by the difference in brightness between the two rooms. The reflective side should be installed toward the room into which a view is desired.

L-O-F Mirropane, coated with evaporated chromium alloy, has many advantages over the chemically deposited transparent mirrors now on the market. Among its merits are durability of coating and uniformity of color of objects viewed through the mirror.

L-O-F Mirropane has been thoroughly tested in our laboratories and in the field through the years and, wherever used, has been found to be satisfactory. They are highly resistant to the normal action of weathering, cleaning, handling and glazing compounds encountered in commercial glazing installations.

L-O-F Mirropane is exceptionally uniform in quality. Such variation as may exist is not apparent to the normal eye in commercial installation.

A bare spot $\frac{3}{16}$ " x 1" at the top and bottom edges of all transparent mirror stock sheets will be found. This is inherent in the manufacturing process and should be concealed in the installation.

Uses

The following suggested uses for L-O-F Mirropane are a few of many possible applications:

In residence entrance doors, hospital observation windows (particularly psychiatric), show windows, department stores, commercial refrigerators, nursery doors in residences, toll houses, kindergartens, night clubs and taverns, security windows in government offices, banks, post offices, FBI offices, police departments private offices, factories and institutions, and colleges and universities (psychology departments). The mirrors aid in reducing shoplifting in super markets, variety stores, and others where the problem exists.

Size Limitations

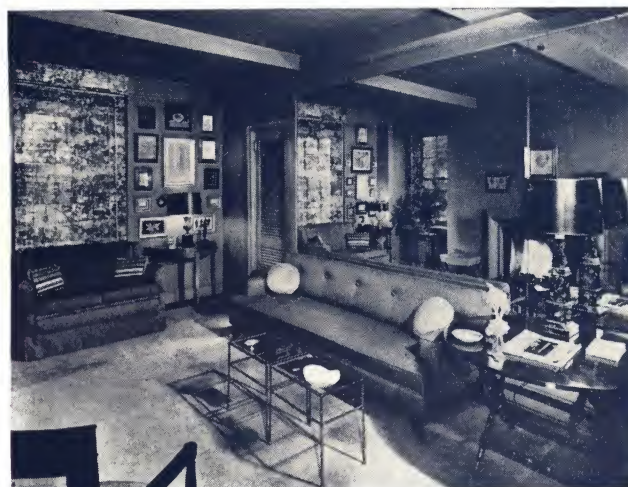
When facing wall areas with large mirror sections, it is generally advisable to keep the size of the sections within 6 x 12 feet, although larger dimensions can be furnished for special conditions. Larger wall areas may also be covered with a series of adjacent mirrors.



Any unevenness in the mirror would make the reflected stripes wavy and distorted. The first photograph above shows what the technician's camera saw at a distance of 29 feet and an angle of 11.5°. Note the perfection of the reflected stripes. But the acid test of this L-O-F Twin-Ground Parallel-O-Plate is in the narrow photograph immediately to the right—taken at an angle of only 7.5°, and a distance of 42 feet from the board. The stripes are straight and sharp, even under these extreme conditions.

Suggested Specifications

Mirrors shall be made of Libbey-Owens-Ford Polished Plate Glass and shall be of (.....) quality and (.....) thickness as defined by Federal Specification DD-G-451a, in sizes as shown on drawings.



A wall mirror appears to double the width of a small and narrow room and add height to a low ceiling. Light is reflected from the windows opposite to give more daylight.

Sizes

L-O-F Mirropane is furnished in stock sheets of 1/8" and 1/4" polished plate glass and in any size up to a maximum of 30" x 40" for 1/8"; and up to 30" x 60" for 1/4". Other sizes available on special order.

Note: Other thicknesses of glass and other types of evaporated metal films will be considered upon application.



To the shopper this Mirropane window in Churchill's Super Market, Toledo, looks like a gleaming wall mirror. But from

Suggested Specifications

Transparent Mirrors shall be Libbey-Owens-Ford Mirropane, of (1/8" or 1/4") thick Polished Plate Glass as defined by Federal Specification DD-G-451a, in sizes as shown on drawings and installed according to manufacturer's recommendation.



the manager's office on the other side an observer can view the floor area without the shopper knowing it.

Tuf-flex® Tempered Plate Glass

Tuf-flex is tempered polished plate glass made by a process of reheating and sudden cooling, as a result of which the outer surfaces are in a state of high compression while the central portion remains in tension, producing a condition highly resistant to breakage. The *Tuf-flex* process can be applied to both clear and colored polished plate glass.

Properties

Tuf-flex is three to five times stronger than plate glass of same area and thickness in sustaining loads and resisting fracture due to strain, and approximately three to five times more resistant to impact shock from blunt objects and four times more resistant to thermal shock. It is more resistant to bending stresses than polished plate glass. A piece of $\frac{1}{4}$ " *Tuf-flex* 42" long and 12" wide can be twisted through an angle of 20° without breaking.

Tuf-flex retains the same appearance, clearness, hardness and coefficient of expansion as regular polished plate glass. *Tuf-flex* cannot be guaranteed against breakage. However, when its limit of resistance is reached, *Tuf-flex* does not break like ordinary glass, but disintegrates into small crystals.

Uses

The greater strength of *Tuf-flex* has resulted in its wide use for visual entrance doors in housing projects and apartment buildings (see below; additional data in Sweet's File for Architects, section 15 $\frac{d}{Li}$), ship's glazing, steam and oil pressure gauge covers, counter tops, show cases, and for enclosures in museums, zoological gardens and aquariums. Its ability to withstand impact makes *Tuf-flex* especially adaptable for balustrades, push and kick plates on doors, windows in gymnasiums and sports arenas, backboards for basketball and handball, and in jails, hospitals and mental institutions. The high resistance of *Tuf-flex* to thermal shock renders it advantageous as lenses for searchlights, floodlights, and spotlights where the heat generated by high intensity lamps would shatter regular glass; for sterilizing ovens; for peep hole glasses in furnaces and lehrs; for windows in oven doors.

Tuf-flex® Tempered Plate Glass Doors

L-O-F *Tuf-flex* Glass Doors are made in 16 types, of $\frac{1}{2}$ inch and $\frac{3}{4}$ inch tempered glass, to finished sizes with either aluminum or bronze fittings. Because of the method of manufacture, *Tuf-flex* glass is not as flat as ordinary plate glass, particularly along the edges. This deviation from flatness is inherent and not objectionable.

The bronze and anodized aluminum fittings with which *Tuf-flex* Doors are equipped are applied on the tempered glass at the factory and cannot be changed or altered at the point of installation without possible damage to the glass. *Tuf-flex* Doors are furnished with either continuous channel or corner fittings at the top and bottom as desired. The Libbey-Owens-Ford Glass Company assumes no responsibility regarding the installation of such doors or breakage. *Tuf-flex* can no more be guaranteed against breakage than any other glass. The beauty of *Tuf-flex* Doors is in the fact that they are completely glass with a minimum of metal fittings. Custom fittings furnished by others will be applied by the Libbey-Owens-Ford Glass Company, provided these fittings are approved by it. Concealed door holders can only be applied where continuous top channels are used.

All *Tuf-flex* Glass Doors are furnished complete with fittings only, which are designed to receive standard pivot hinges and other builders' hardware. Glass Doors are installed like any pivot hinged door. Door frames or jambs of aluminum, bronze, stainless steel or other metal are preferable. Where wood frames are desired, the best installation will result if the head jamb is reinforced with metal, or if a steel plate is added to the wood header. This is to insure complete anchorage for pivot hinges and similar builders' hardware which must be installed in the frame. *Tuf-flex* Doors are ideally suited to be operated by photoelectric control.

Push-Pull Bars

The Push-Pull bar should be in a vertical position on the swing side of the door. When it is desired to attach the Push-Pull bar to a center lock, a hole will be drilled through the lock and strike fitting.

Tuf-flex Glass Doors offer as much or more protection against burglary than typical entrance doors which contain ordinary plate glass. Overhead contact members to operate burglar alarms may be used with *Tuf-flex* Doors having top fittings for contact point. Where the tape method of protection is contemplated, only a small segment of tape need be used. (Subject to Underwriters' Laboratory approval.) A definite schedule of *Tuf-flex* Door insurance rates may be arranged with various insurance agencies.

Special Conditions

Tuf-flex can be ordered in circles, squares, rectangles and special shapes cut to pattern. It can also be supplied in a variety of edge finishes. However, since it cannot be cut after it is tempered, the exact sizes required must be specified, and intricate designs should be submitted for approval.



Tuf-flex Tempered Plate Glass windows have proved themselves to many school boards, especially on the playground side of the building where frequent breakage has made reglazing a constant expense. (Deer Park School, Fairfax, California. Architect: John Lyon Reid, San Francisco)

Suggested Specifications

All tempered glass shall be Libbey-Owens-Ford *Tuf-flex* Polished Plate Glass, (.....) thick and (.....) quality as defined by Federal Specification DD-G-451a, in sizes as shown on drawings.

Chart for Specifying *Tuf-flex* Glass

Kind	Thickness	Min. Width	Max. Size	Thickness Tolerance	Dimensional Tolerance
Regular Polished Plate Glass	1/4", 3/8", 1/2"	2"	72" x 120"	±1/32"	±1/16"
	5/8", 3/4"	2"	72" x 120"	±3/64"	±1/16"
	7/8", 1", 1 1/4"	2"	42" x 96"	±1/16"	±1/16"
Color Clear Polished Plate	1/4"	2"	72" x 120"	±1/32"	±1/16"
Colored Polished Plate	7/32"	2"	48" x 72"	±1/32"	±1/16"
Golden Polished Plate	1/4"	2"	72" x 120"	±1/32"	±1/16"
Heat Absorbing Polished Plate	1/4"	2"	72" x 120"	±1/32"	±1/16"

Circles and squares are available.

	1/4" Plate	1/4" <i>Tuf-flex</i>
Modulus of Rupture (Avg.) lbs./sq. in.	6,000	30,000
Resistance to Thermal Shock	100°F	400°F
Comparison of Impact:		
Height Dropped—2 lb. Steel Ball	Avg. 8"	Avg. 44"
Height Dropped—11 lb. Shot Bag	Avg. 32"	Avg. 120"

Fire Retardment

Although *Tuf-flex* withstands temperature differentials up to 400° F., it cannot be considered a fire retardant. (Does not qualify as a Fire Door in Underwriters' Laboratory Code.) However, *Tuf-flex* plate glass may be logically used in all doors where ordinary plate glass is used.



Tuf-flex Polished Plate Glass doors substantially reduce the susceptibility to breakage and furnish polished clarity to this theatre entrance. (Delman Theatre, Dallas, Texas. Architects: Raymond F. Smith and A. B. Swank)

Suggested Specifications

All doors shall be tempered plate glass (as defined by Federal Specifications DD-G-451a) (1/2" or 3/4" thick) inches high by inches wide, equipped with fittings of (solid bronze or aluminum) and with a finish, as manufactured by Libbey-Owens-Ford Glass Company, Toledo, Ohio, and installed according to manufacturer's instructions.

Data for Specifying *Tuf-flex* Glass Doors

Made in 16 types to standard or special size of tempered glass only. Most-used types are B, P and B/P.

Sizes: Width up to 48". Length up to 108". Tolerance, plus 0, minus 3/32". Thickness: 1/2" and 3/4". Thickness tolerance: 3/16".

Six Standard Sizes

29 13/16" x 83 11/16"	35 13/16" x 83 11/16"	41 13/16" x 83 11/16"
30" x 84"	36" x 84"	42" x 84"

Clearances: Top, 1/8". Bottom, 1/8" to 1/4" (3/16" recommended). Hinged Side, 1/8". Non hinged side, 1/8" (may reach 7/32" because of 3/32" tolerance).

Holes: Minimum size, 7/8". Must be drilled before tempering at factory.

Minimum distance, edge of door to nearest edge of hole, 3".

Minimum distance, tip of glass corner to nearest edge of hole, 4 1/2".

Tolerance between holes or in location of a hole, 3/32".

Attached metal fittings: Solid bronze or aluminum only. Finishes: polished bronze, brushed bronze, polished chrome plating, brushed chrome plating, aluminized aluminum.

Strength: 3 to 5 times stronger than plate glass of same thickness.

Kick plates: Not recommended.

Cutting or drilling: In factory only, before fabrication.

Push-pull bars: Recommended placement, 42" from bottom of door to center of bar. Recommended position, vertical, on swing side. Can be supplied by Libbey-Owens-Ford in sizes 12" and 14".

(Complete installation details are shown in catalog TF-1. Ask for a copy or see it in Sweet's File for Architects, 15d/Li.)

Window Glass

L-O-F Flat Drawn Sheet Glass—representing the result of more than 30 years of quality glass manufacturing—is exceptionally transparent and has a natural fire-finished surface. It is relatively free of distortion. L-O-F uses its own Flat Drawn Process in manufacturing sheet glass. The result is a better annealed window glass that is less subject to breakage in cutting.

Uses

Libbey-Owens-Ford Sheet Glass for glazing windows, doors and storm sash in homes, apartments and other types of buildings; cabinet fronts and shelving.

Libbey-Owens-Ford Heavy Sheet Glass for glazing windows and doors where greater strength is required but where slight distortion is not objectionable; shelving; display cases; window ventilators, jalousies and furniture tops.

Libbey-Owens-Ford Picture Glass for covering pictures, photographs, maps and prints; projector slides, novelties and instrument dials.

Shipped in soundly-constructed boxes, Libbey-

Owens-Ford Sheet Glass is given neat, clean and practically moisture-proof protection.

Libbey-Owens-Ford Sheet Glass is classified on the basis of thickness as Window, Heavy Sheet and Picture Glass.

Thicknesses

Window Glass is supplied in two thicknesses:

1. Single Strength, varying from 10 to 11.8 lights per inch and identified by a red label.
2. Double Strength, varying from 7.5 to 8.7 lights per inch and identified by a blue label.

Window Glass is supplied in four standard qualities:

"AA"—Specially selected glass for high grade work.

"A"—Select glass of superior glazing quality.

"B"—Suitable for general glazing purposes.

Greenhouse—Double strength glass suitable for this purpose in sizes 16" x 18", 16" x 24", 18" x 20" and 20" x 20".

Heavy Sheet Glass is supplied in thicknesses of $\frac{3}{16}$ " and $\frac{7}{32}$ ", and in qualities "AA", "A", and "B."

Picture Glass is furnished in three standard thicknesses listed in the chart to the right, and in "AA", "A", and "B" qualities.

Heat Absorbing Heavy Sheet Glass is supplied in $\frac{7}{32}$ " thickness and in standard quality.

Safety Glass

Where vision and greater protection are required, L-O-F Safety Glass has solved the problem in widely varying applications. An improved technique in bending has broadened its usefulness. For years, L-O-F Safety Glass has been a standard in the automotive and transportation industries.

Libbey-Owens-Ford Hi-Test Safety Glass is made of two lights of polished plate or sheet glass bonded by tough transparent plastic, and represents the highest achievement in safety glass quality and performance. The interlayer is a properly plasticized

polyvinyl butyral resin which has unusual strength, elasticity and adhesion. When safety glass is fractured, the particles of glass tend to adhere to the plastic, affording more protection against flying glass fragments.

While Safety Glass is considered entirely satisfactory for use in vehicles, it is not usually recommended for exterior glazing in buildings unless certain precautions are observed in setting. Since the chemical action of certain glazing compounds over a period of years may cause the plastic interlayer to deteriorate, the life of Safety Glass cannot be considered in terms of a building's expected life.

Bullet Resisting Glass

Bullet Resisting Plate Glass, composed of a minimum of four layers of glass and a minimum of three layers of Hi-Test plastic, is extensively used for glazing bank teller cages, cashier booths, jewelry store display cases, and observation windows in pressure test chambers. Thicknesses 1 $\frac{1}{8}$ ", 1 $\frac{1}{2}$ " and 2" up to 28" x 36" inclusive are available to Underwriters' Laboratories specifications for indoor and outdoor installations in bandit-resisting enclosures. These thicknesses in larger sizes available subject to revised construction details.

Clients will appreciate the added protection which L-O-F bullet-resisting glass will afford them and their employees. An installation would pay for itself in protection of valuables, customers and workers if a single robbery were thwarted because of its use. Bullet-resisting glass is clear and, in many installations, cannot be detected without a close inspection. To an individual unacquainted and unfamiliar with this purposeful product, it appears to be an ordinary pane of glass. This characteristic adds to its protective value. For example, the illustration at the right gives absolutely no outward appearance of utilizing Bullet Resisting Plate Glass, but cashiers know the security of working, with the glass as a protective shield.



Double
Strength
Window
Glass

The flatness and high light transmission of Libbey-Owens-Ford window glass have led to its being specified for many outstanding buildings such as the All Souls School in San Francisco, Calif. Architect: Mario Ciampi.

Suggested Specifications

All window or sheet glass shall be Libbey-Owens-Ford Flat Drawn ("A") Quality (Double Strength) as defined by Federal Specification DD-G-451a. Each light shall bear the identifying L-O-F label.

Chart for Specifying Window Glass

Classification	Quality	Thick-ness in Inches	Approx-imate Wt Sq. Ft. in Ozs.	Maximum Sizes (Under Normal Conditions)
Window Glass				
Single Strength	"AA," "A," "B"	.085-.100	19.50	90 united in.*
Double Strength	"AA," "A," "B"	.115-.133	26	120 united in.*
Double Strength	Greenhouse	.115-.133	26	16" x 18" 16" x 24" 18" x 20" 20" x 20"
3/16" Heavy Sheet	"AA," "A," "B"	.182-.205	40	76" x 120"
7/32" Heavy Sheet	"AA," "A," "B"	.205-.230	45	76" x 120"
Picture Glass				
19-23 lbs. per in.	"AA," "A," "B"	.043-.053	9 to 11	60 united in.*
Picture Glass				
15-17 lbs. per in.	"AA," "A," "B"	.058-.068	12 to 14	60 united in.*
Picture Glass				
12-14 lbs. per in.	"AA," "A," "B"	.070-.080	15 to 17	60 united in.*
7/32" Heat Absorbing Heavy Sheet	Standard	.205-.230	45	Not over 15 Sq. Ft. Per Light

*United inches is sum of width plus length.

AVERAGE SOLAR RADIATION TRANSMITTANCES OF L-O-F WINDOW GLASS AT NORMAL INCIDENCE

	Single Strength	Double Strength	3/16" Sheet	7/32" Sheet	9-11 oz.	12-14 oz.	15-17 oz.
Ultraviolet	76.6	73.4	68.8	66.8	81.6	79.9	78.1
Illuminant C (Ava. Daylight)	90.8	90.4	89.6	89.2	91.5	91.3	91.0
Total Solar Radiation*	87.3	85.7	82.9	81.5	89.6	88.8	88.0

*Solar radiation values are normal incidence transmittances for source that has energy distribution of the sun at 30° altitude (air mass equals two) (approximately 10% ultraviolet, 40% visible rays, 50% infrared).

Kinds of Glass	Number of Lights	Thick-ness of Safety Glass	Thick-ness Toler-ance	Maximum Area per Lt.	Net Weight Lbs. per Sq. Ft.
Thin Safety Glass	2	5/32"	- 1/32"	Up to 7 sq. ft.	1.92
S.S. Safety Glass	2	7/32"	± 1/32"	Sizes up to 15 sq. ft. of area	2.49
Combination Safety Glass (S.S. & D.S.)	2	15/64"	± 1/32"		2.91
D.S. Safety Glass	2	7/16"	± 1/32"		3.32
Safety Plate	2	1/4"	± 1/32"	60 x 90	3.16

Heavy Flat Safety Plate

Thicknesses: 1 1/32", 3/8", 13/32", 1/2", 5/8", 3/4", 7/8", 1".
Maximum Standard Size: 30" x 72".
Weights: Range from 4.47 to 13 lbs. per sq. ft.

Thicknesses	Thickness Tolerances	Dimensional Tolerances
1 1/32", 3/8", 13/32", 1/2", 5/8", 3/4", 7/8", 1"	Plus or minus 1/32" Plus or minus 1/16"	Plus or minus 1/16" Plus 0 minus 1/8"

Note: Safety Glass made with *Tuf-flex* (pages 6 and 7) has extra strength qualities.



Bullet Resisting Glass offers needed protection to tellers in banks like this. And as the degree of isolation from other tellers increases, so do the hazards. That's why L-O-F Bullet Resisting Glass is specified for the popular drive in depositories, too. (Fletcher Trust Company, Arlington Ave. Branch, Indianapolis, Indiana. Architects: Vonnegut, Wright and Yeager)

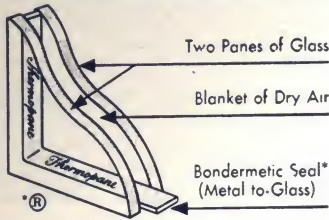
Suggested Specifications

All Bullet-Resisting Plate Glass shall be made by Libbey-Owens-Ford Glass Company in thickness and in sizes as shown on drawings.

Thicknesses	Thickness Tolerance	Maximum Standard Size	Dimensional Tolerance	Net Weights Lbs. Per Sq. Ft. unpacked
3/4"	± 1/16"	30" x 72"	+0, -1/8"	9.81
7/8"	± 1/16"	30" x 72"	+0, -1/8"	11.45
1"	± 1/16"	30" x 72"	+0, -1/8"	13.08
1 1/8"	± 1/16"	30" x 72"	+0, -1/8"	14.72
1 1/4"	± 1/16"	30" x 72"	+0, -1/8"	15.51
1 1/2"	± 1/16"	30" x 72"	+0, -1/8"	19.62
1 5/8"	± 1/16"	30" x 72"	+0, -1/8"	20.44
2"	± 1/16"	30" x 72"	+0, -1/8"	26.16
2 1/4"	± 1/16"	30" x 72"	+0, -1/8"	27.39
2 1/2"	± 1/16"	30" x 72"	+0, -1/8"	32.70
3"	± 1/16"	30" x 72"	+0, -1/8"	39.24

Thermopane® Insulating Glass

CUTAWAY OF METAL-SEAL Thermopane



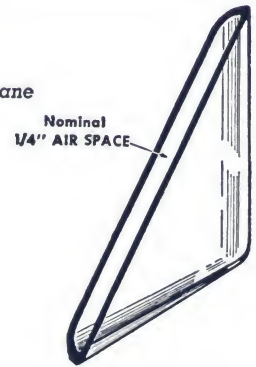
Thermopane was the first successful, mass-produced, insulating unit of its kind for general use. It is a factory-built glass unit composed of two or more lights of glass separated by $\frac{1}{4}$ " or $\frac{1}{2}$ " of dehydrated captive air, hermetically sealed around the edges at the factory with a metal-to-glass bond.

The glass is specially washed, the air scientifically cleaned and dried, and the Bondermetic Seal* applied at atmospheric pressure. The unit is not vacuum sealed.

Thermopane units provide a high resistance to heat flow, varying with the number of panes and the thickness of the air space. In summer Thermopane's low heat transmission coefficient reduces the load on air conditioning systems. In winter it saves heat.

CUTAWAY OF GLASS-SEAL Thermopane

Glass-Seal Thermopane is now available in limited sizes for wood and metal panel windows. For detailed information contact your nearest L-O-F District Office.



The greater efficiency of Thermopane compared with single glazing makes it possible to use larger windows and keep the cost of fuel constant. For example, this means that a home could have 115 square feet of double Thermopane and lose no more heat than a similar home would lose with 65 square feet of single glazing. Thermopane permits the influx of a large amount of solar heat without a prohibitive compensating loss. *

Glazing Information

ALL TYPES
OF SASH

Thermopane is a factory sealed insulating glass unit which is subject to continuous movement due to the changes of temperature and barometric pressure. Adequate provision should be made for expansion and contraction of all metal glazing members—particularly long continuous expanses of metal members—to provide against any pressure on the glass. To insure against breakage or seal failure, a cushioning material such as glazing compound, Neoprene, or Vinyl, must be used so there is no contact between sash or glass at any point. Therefore, the warranty for Thermopane does not apply unless the following instructions are followed in every detail:

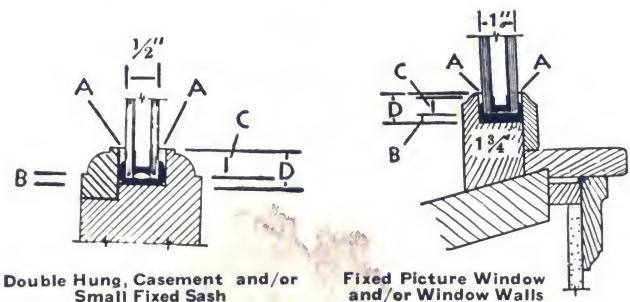
1. Thermopane must not be installed unless sash opening is square and plumb so that proper face and edge clearance can be maintained.
2. Face clearances between glass and stops must not be less than $\frac{1}{8}$ ".
3. Edge clearances between glass and frame must not be less than $\frac{1}{8}$ " on each edge for $\frac{1}{2}$ " thick Thermopane, or $\frac{1}{4}$ " on each edge for units over $\frac{1}{2}$ " thick.
4. Use a good knife-grade, non-hardening glazing compound, free from corrosive materials. Do not cut. DO NOT USE PUTTY.
5. To insure uniform clearances use L-O-F Neoprene Setting Blocks and Spacers on all units set with face stops.
6. Use L-O-F Metal Glazing Clips for $\frac{1}{2}$ " thick Thermopane on sash without face stops.
7. Locate Setting Blocks or Glazing Clips in from each corner a distance of one-fourth the width of the glass.
8. Use full bed of glazing compound on bottom of sash, enough at sides and top to make weather tight seal.
9. Trim and slope glazing compound from glass to outside stop for water drainage.
10. Do not nip corner or grind edges.
11. All units manufactured with any type of Heat Absorbing glass must have Heat Absorbing to outside only.

Installation Clearances and Rabbit Depths

Symbol and Explanation	Glass Thickness				
	D. S. A. $\frac{1}{8}$ " Plate $\frac{1}{8}$ " Patterned	$\frac{3}{16}$ " Sheet Glass	$\frac{1}{4}$ " Plate $\frac{7}{32}$ " or $\frac{1}{4}$ " Patterned		
Glass Sizes	under 80 united inches‡	under 80 united inches‡	from 80-120 united inches‡	under 80 united inches‡	over 80 united inches‡
A—Glazing compound Bed	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "
B—Glazing Clearance (all edges)	$\frac{1}{8}$ "	$\frac{1}{4}$ "	$\frac{1}{4}$ "	$\frac{1}{4}$ "	$\frac{1}{4}$ "
C—Metalized Edge—Depth	$\frac{3}{8}$ "	$\frac{3}{8}$ "	$\frac{3}{8}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "
D—Total Rabbit Depth	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{5}{8}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "

‡Sum of length plus width.

It is extremely important to remember that Thermopane is a factory-fabricated unit and, once made to specifications, its dimensions cannot be changed at point of use. Proper installation clearances must be allowed on all Thermopane units, as well as sufficient rabbit depth, so that the metal seal does not show. The chart above and drawings at right give this information.



Thermal Shock

Hot air directed onto glass may cause breakage. This is true in single glass as well as *Thermopane*. When the difference in temperature within a light of glass is excessive, breakage may be expected.

Covering glass with paper and painted areas on glass (signs, etc.) should be avoided. Such coverings act as a heat trap and may cause glass failure due to increase in temperature of the areas covered.

Metal Sash

Engineering practice dictates the need for sufficient columnar strength and for suitable expansion joints in metal sash members. The design and spacing of expansion joints should be the work of the architect, engineer or metal manufacturer.

Surface Finishes

Sandblast finish is available, but details must be

submitted for our approval. Sandblast is applied to the air space surface only, either to one or both lights in order to provide cleanliness. Exterior sandblast will not be furnished. As sandblasting of glass reduces its strength 50%, we do not recommend *Thermopane* units with a sandblast surface. Blue Ridge patterns should be considered when obscurity is needed.

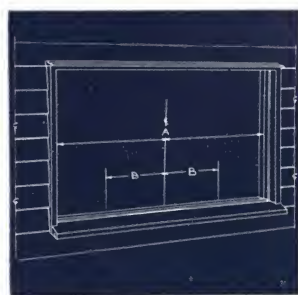
Shapes and Pattern Cut

Thermopane will be manufactured to straight edge patterns for airport control towers, production accounts and for the gable ends of residences or schools where other glass used is *Thermopane*. Units can be produced with four or five sides but no angle can be less than 45° nor any one edge less than eight inches. Triangles cannot be furnished. Maximum sizes are governed by dimensional tolerances shown on page fifteen. The relation of width to height must be within 4½ times the width to height ratio.

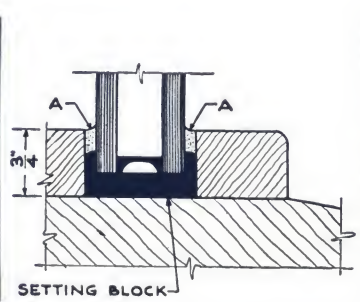
Use of Neoprene Setting Blocks and Metal Glazing Clips

For the proper operation of *Thermopane* all units must be supported on soft-surfaced setting blocks. To enable glaziers and others to install *Thermopane* successfully, Libbey-Owens-Ford has available Neoprene setting blocks for units ½", ¾", and 1" thick.

Also, for units ½" thick the company has available a metal glazing clip for use in steel, aluminum and wood sash. Drawings below show use of setting blocks and glazing clips. Under no circumstances should units be forced into any type of sash.



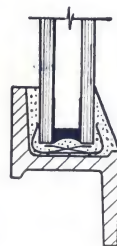
Positions of Setting Blocks



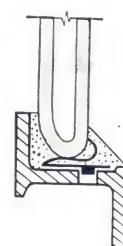
Neoprene Setting Block in Position



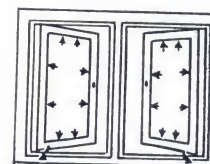
Spacer Strips in Position



Glazing Clip in Metal Sash



Glazing Clip for Glass-Seal



Arrows: Positions of Glazing Clips

Thermopane Warranty

For a period of five (5) years from the date of manufacture, we warrant that, under normal conditions, material obstruction of vision, resulting from film formation or dust collection between the interior glass surfaces of *Thermopane*, will not occur.

This warranty will be void if *Thermopane* is not installed in accordance with our installation instructions, or if any cutting, fitting, or nipping of edges or corners, is done, accidentally or otherwise, after

shipment from our factory, or if the unit is damaged in handling, installation or otherwise.






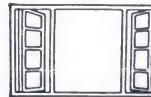
Our maximum liability under this warranty shall be the delivery of replacement lights of *Thermopane* to the railroad shipping point nearest the place of installation.

This warranty does not apply to such replacement lights beyond the original five year period applying to the original unit; nor does it apply when *Thermopane* is used in ships, railroad cars or other vehicles, or is used outside continental United States.

Standard Sizes of 1" Thick Thermopane Units

(SEE FACING PAGE FOR 1/2" THICK UNITS)

(2 panes $\frac{1}{4}$ " Polished Plate With $\frac{1}{2}$ " Air Space)

Sash Manufacturer	Window Style	Sash Opening Width	Sash Opening Height	Glass Opening Width	Glass Opening Height	
Any manufacturer shown on this page can provide picture window sash without flanking units.	Picture Window Alone			Use any size shown on this page		
						
Window walls can be constructed by using a series of Picture Window sash separated by mullions.	Window Wall					
						
		Glass sizes shown are for 8' and 8½' ceiling heights respectively, allowing 1'-6" from floor to sill and 1'-0" from head to ceiling		42" x 66" 56½" x 66" 64½" x 66" 72½" x 66" 84" x 66" 96" x 66" 42" x 72" 84" x 72" 96" x 72"		
Andersen Corp., Bayport, Minn. Anderson Mfg. Co., Inc., Owensboro, Ky. Binswanger and Co., Inc., Richmond 21, Va. Carr Adams & Collier Co., Dubuque, Iowa Chicago & Riverdale Lumber Co., Chicago, Ill. Cole Mfg. Co., Memphis, Tenn. Curtis Companies, Inc., Clinton, Iowa Exchange Lumber & Mfg. Co., Spokane, Wash. Farley & Loetscher Mfg. Co., Dubuque, Iowa General Woodcraft Co., Inc., North Bergen, N. J. Hallack & Howard Lumber Co., Denver, Colo. Harris Bros. Lbr. Co., Chicago 9, Ill. Edward Hines Lbr. Co., Chicago 8, Ill. Huttig Mfg. Co., Muscatine, Ia. Huttig Sash & Door Co., St. Louis, Mo. Ideal Company, Waco, Texas Malta Mfg. Co., Malta, Ohio Prefabricators, Inc., Denver 17, Colo. Radford Co., Oshkosh, Wis. Roach & Musser Co., Muscatine, Iowa Rock Island Millwork, Rock Island, Ill. Weather-Seal, Inc., Barberton, Ohio Wisconsin Window Unit Co., Merrill, Wis.	4'-4" x 4'-2" 5'-0" x 4'-2" 5'-8" x 4'-2" 6'-4" x 4'-2" 4'-4" x 4'-6" 5'-0" x 4'-6" 5'-8" x 4'-6" 6'-4" x 4'-6" 7'-0" x 4'-6" 8'-4" x 4'-6" 4'-4" x 5'-2" 5'-8" x 5'-2" 6'-4" x 5'-2" 7'-0" x 5'-2" 8'-4" x 5'-2" 10'-0" x 5'-2" 5'-0" x 5'-10" 5'-8" x 5'-10" 6'-4" x 5'-10"	48½" x 46" 56½" x 46½" 64½" x 46" 72½" x 46" 48½" x 50" 56½" x 50" 64½" x 50" 72½" x 50" 80½" x 50" 96½" x 50" 48½" x 58" 64½" x 58" 72½" x 58" 80½" x 58" 96½" x 58" 116½" x 58" 56½" x 66" 64½" x 66" 72½" x 66"				
Gate City Sash & Door Co., Fort Lauderdale, Fla. Fox Bros. Mfg. Co.,* St. Louis 4, Mo. *Furnished only in Protexol fire-proofed wood	Standard Wood Picture Window Units with Flanking Awnings					
						
		51½" x 51" 72¾" x 57" 60¾" x 57" 48¾" x 57" 119½" x 63"	64½" x 46" 70½" x 52½" 58½" x 52½" 46½" x 52½" 116½" x 58"			
	Standard Aluminum Picture Window Units with Flanking Casements					
						
Reynolds Metal Co., Louisville, Ky. Ware Laboratories, Inc., Miami, Fla.	4'-5½" x 4'-2½" 4'-5½" x 5'-3" 5'-9¾" x 4'-2½" 5'-9¾" x 5'-3"	50¾" x 47¾" 50¾" x 60¾" 66¾" x 47¾" 66¾" x 60¾"				
Andersen Corp., Bayport, Minn. Brown-Graves Co., Akron, Ohio. For list of sizes contact manufacturer. Curtis Companies, Inc., Clinton, Iowa. For list of sizes, contact manufacturer. Farley & Loetscher Mfg. Co., Dubuque, Iowa Only sizes marked † Rolscreen Co., Pella, Iowa Only sizes marked * Rock Island Millwork Co., Rock Island, Ill. For list of sizes, contact manufacturer. Wisconsin Window Unit Co., Merrill, Wis. For list of sizes, contact manufacturer.	Standard Wood Picture Window Units with Flanking Casements					
						
		6'-5¼" x 3'-2¾" 8'-1" x 3'-2¾" 9'-8¾" x 3'-2¾" 6'-5¼" x 4'-2¾" 8'-1" x 4'-2¾" 9'-8¾" x 4'-2¾" 6'-5¼" x 5'-2¾" 8'-1" x 5'-2¾" 9'-8¾" x 5'-2¾" 3'-10¾" x 3'-2¾" 5'-11" x 5'-2¾" 3'-10¾" x 4'-2¾" 5'-11" x 4'-2¾" 3'-10¾" x 5'-2¾" 5'-11" x 5'-2¾" 4'-3" x 4'-4" 6'-3" x 4'-4" 4'-3" x 5'-4" 6'-3" x 5'-4" †5'-0" x 5'-10" †5'-8" x 5'-10" †6'-4" x 5'-10"	(Including Casements) *35½" x 36" *55¼" x 36" *75" x 36" *35½" x 48½" *55¼" x 48½" *75" x 48½" *35½" x 60¾" *55¼" x 60¾" *75" x 60¾" *44½" x 36" *68¾" x 36" *44½" x 48½" *68¾" x 48½" *44½" x 60¾" *68¾" x 60¾" *48" x 48" *72" x 48" *48" x 60" *72" x 60" †56½" x 66" †64½" x 66" †72½" x 66"			
General Bronze Corp., Garden City, L. I. Contact manufacturer for additional sizes of sash for non-standard Thermopane	Aluminum Sash Picture Window Units	4'-0" x 4'-8" 5'-0" x 4'-8" 6'-0" x 4'-8" 4'-0" x 5'-0" 5'-0" x 5'-0" 6'-0" x 5'-0"	46½" x 52½" 58½" x 52½" 70½" x 52½" 46½" x 56½" 58½" x 56½" 70½" x 56½"			
Adams & Westlake*, Elkhart, Ind. Cupples Products Co., Maplewood, St. Louis 17, Mo. Fleet of America, Buffalo 2, N. Y. General Bronze Corp., Alwintite Div., Garden City, L. I. Ceco Steel Products Corp., Sterling Aluminum Window Div., New York 17, N. Y.	Standard Aluminum Picture Window Units with Flanking Double Hung Sash	3'-2" x 4'-2" 4'-4" x 4'-6" 5'-0" x 4'-6" 5'-8" x 4'-6" 6'-4" x 4'-6" 7'-0" x 4'-6" 5'-8" x 5'-2" 6'-4" x 5'-2" 7'-0" x 5'-2"	35½" x 48½" 48½" x 50" 56½" x 50" 64½" x 50" 72½" x 50" 80½" x 50" 64½" x 58" 72½" x 58" 80½" x 58"			
*Indicates These Firms Manufacture to Order						
Wm. Bayley Co., Springfield, Ohio Bliss Steel Products Co., E. Syracuse, N. Y. Ceco Steel Products Co., Chicago 50, Ill. Detroit Steel Prod. Co., Detroit 11, Mich. Michael Flynn Mfg. Co., Phila. 24, Pa. Hopes' Windows, Inc., Jamestown, N. Y. Merkel Bros., St. Louis, Mo. J. S. Thorn Co., Phila. 32, Pa. Truscon Steel Co., Youngstown, Ohio	Residential Steel Sash Picture Window Units	4'-5½" x 4'-2½" 4'-5½" x 5'-3" 5'-9¾" x 4'-2½" 5'-9¾" x 5'-3"	50¾" x 47¾" 50¾" x 60¾" 66¾" x 47¾" 66¾" x 60¾"			
						
Solar Air-Flow, Inc., Elkhart, Ind. Wisconsin Window Unit Co., Merrill, Wis. For list of sizes, contact Manufacturer	Standard Wood Picture Window Units with Louvers (3)	39¾" x 53¾" 39¾" x 65¾" 39¾" x 77¾" 49¾" x 65¾" 49¾" x 74¾" 49¾" x 89¾"				

This does not purport to be a complete list of manufacturers of sash for Thermopane. Neither does it show all the styles of sash made by the manufacturers listed. Many local sash and door manufacturers are now fabricating sash suitable for Thermopane. Since this list was prepared other manufacturers may now be making Thermopane sash. This list is intended only as a guide to you in contacting your normal source of supply for obtaining Thermopane sash.

Thermopane made with window glass should not be turned when set . . . specify width first. All Thermopane units made of polished plate glass can be installed with either dimension set vertically. Window oper-


This does not purport to be a complete list of manufacturers of sash for Thermopane. Neither does it show all the styles of sash made by the manufacturers listed. Many *local* sash and door manufacturers are now fabricating sash suitable for Thermopane. Since this list was prepared other manufacturers may now be making Thermopane sash. This list is intended only as a guide to you in contacting your normal source of supply for obtaining Thermopane sash.


Thermopane made with window glass should not be turned when set . . . specify width first. All Thermopane units made of polished plate glass can be installed with either dimension set vertically. Window openings will vary according to individual sash manufacturer's specifications. Therefore, manufacturers should be contacted for full information regarding their units.

Standard Sizes of 1/2" Thick Thermopane Units


(SEE FACING PAGE FOR 1" THICK UNITS)


(2 panes 1/8" Polished Plate, or DSA Window Glass, With 1/4" Air Space)


Sash Manufacturer	Window Style	Sash Width	Opening Height	Glass Size Width	Glass Size Height
Binswanger Co., Inc. Richmond 21, Va.	Double Hung Wood Windows (2-Light) 	2'-0"	4'-2"	20"	22"
Chicago & Riverdale Lumber Co. Chicago, Ill.		2'-4"	4'-2"	24"	22"
Chicago & Riverdale Lumber Co. Chicago, Ill.		2'-4"	4'-6"	24"	24"
Chicago & Riverdale Lumber Co. Chicago, Ill.		2'-8"	4'-6"	28"	24"
Exchange Lbr. & Mfg. Co. Spokane, Wash.		3'-0"	4'-6"	32"	24"
Exchange Lbr. & Mfg. Co. Spokane, Wash.		3'-4"	4'-6"	36"	24"
General Woodcraft Co., Inc. North Bergen, N. J.		3'-8"	4'-6"	40"	24"
General Woodcraft Co., Inc. North Bergen, N. J.		4'-0"	4'-6"	44"	24"
Harris Bros. Lumber Co. Chicago 9, Ill.		2'-4"	5'-2"	24"	28"
Harris Bros. Lumber Co. Chicago 9, Ill.		2'-8"	5'-2"	28"	28"
Ed. Hines Lumber Co. Chicago 8, Ill.		3'-0"	5'-2"	32"	28"
Ed. Hines Lumber Co. Chicago 8, Ill.		3'-4"	5'-2"	36"	28"
Olson Millwork Company Cedar Rapids, Iowa		3'-8"	5'-2"	40"	28"
Olson Millwork Company Cedar Rapids, Iowa		4'-0"	5'-2"	44"	28"

Binswanger Co., Inc. Richmond 21, Va. Chicago & Riverdale Lbr. Co. Chicago, Ill. Exchange Lbr. & Mfg. Co. Spokane, Wash. General Woodcraft Co., Inc. North Bergen, N. J. Harris Bros. Lbr. Co. Chicago 9, Ill. Ed. Hines Lbr. Co. Chicago 8, Ill. Olson Millwork Company Cedar Rapids, Iowa	Double Hung Wood Windows (4-Light) 	2'-0" x 4'-2" 2'-4" x 4'-2" 2'-4" x 4'-6" 2'-8" x 4'-6" 3'-0" x 4'-6" 3'-4" x 4'-6" 3'-8" x 4'-6" 4'-0" x 4'-6" 2'-4" x 5'-2" 2'-8" x 5'-2" 3'-0" x 5'-2" 3'-4" x 5'-2" 3'-8" x 5'-2" 4'-0" x 5'-2"	20" x 10 1/2" 24" x 10 1/2" 24" x 11 1/2" 28" x 11 1/2" 32" x 11 1/2" 36" x 11 1/2" 40" x 11 1/2" 44" x 11 1/2" 24" x 13 1/2" 28" x 13 1/2" 32" x 13 1/2" 36" x 13 1/2" 40" x 13 1/2" 44" x 13 1/2"
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Roilscreen Co. Pella, Iowa	Wood Casements 	23" x 40" 23" x 52" 23" x 64" 27" x 28" 27" x 36" 27" x 40" 27" x 52"	20" x 36" 20" x 48" 20" x 60" 24" x 24" 24" x 32" 24" x 36" 24" x 48"
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Curtis Companies, Inc. Clinton, Iowa Gate City Sash & Door Co. Ft. Lauderdale, Fla. General Woodcraft Co., Inc. North Bergen, N. J. Ludman Corporation Miami, Fla. Metz Mfg. Co. Dubuque, Iowa Roach & Musser Co. Muscatine, Iowa	Wood Awning Windows 		20" x 16" 32" x 16" 44" x 16" 28" x 18" 36" x 18" 44" x 18"
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Miss Steel Products Co. E. Syracuse, N. Y. Druwhit Metal Products Co. Los Angeles 11, Cal. Michael Flynn Mfg. Co. Philadelphia 24, Pa. Hopes' Windows, Inc. Jamestown, N. Y. Soule Steel Co. San Francisco 24, Cal. Truscon Steel Co. Youngstown, O.	Residential Steel Casements (Without Mullins) 	For detailed information about omitting mullins contact any L-O-F district office	T-1 15 1/16" x 35 1/16" T-2 15 1/8" x 36 1/8" T-3 15 1/8" x 47 1/8" T-4 15 1/8" x 48 1/8" T-5 17 1/16" x 36 1/16" T-6 17 1/8" x 48 1/8"
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	Panel Window System (Wood) 	45 3/4" x 25 3/4"	45 1/2" x 25 1/2"
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WOOD
Builders Products, Inc.
Cleveland, Ohio
Curtis Companies
Clinton, Iowa
Curtis Companies
Lincoln, Nebr.
Curtis Companies
Topeka, Kansas
Curtis Companies
Chicago, Ill.
Curtis Companies
Wausau, Wis.
Curtis Companies
Minneapolis, Minn.
Dyke Bros.
Little Rock, Ark.
Fabrow Mfg. Co.
Toledo 9, Ohio

Fred Reuten, Inc.
Closter, N. J.
Falls Lumber Co.
Cuyahoga Falls, Ohio
Goshen Sash & Door Co.
Goshen, Ind.
Lubbock Sash & Door Co.
Lubbock, Texas
Ohio Plate Glass Co.
Toledo 4, Ohio
Pease Woodwork Co.
Cincinnati 23, Ohio
Pre-Fabricators, Inc.
Denver 17, Colo.
Randall Bros.
Atlanta, Ga.


Royal Glass Works
Long Island City, N. Y.
Rust Sash & Door Co.
Kansas City, Mo.
Universal Window Co.
Austell, Ga.
Universal Window Co.
Charlotte, N. C.
Wadsworth Millwork Co.
Wadsworth, Ohio
Wisconsin Window Unit Co.
Merrill, Wis.
Work-Millwork
Monterey, Calif.
Solar Air-Flo, Inc.
Elkhart, Ind.

Sash Manufacturer	Window Style	Sash Opening Width	Sash Opening Height	Glass Size Width	Glass Size Height
WOOD All manufacturers of the wood panel window system listed above manufacture wood ventilators. ALUMINUM A B C Steel Equipment Co. New York City 10, N. Y. Aluminum Home Products Co. Knoxville, Tenn. Marmet Corp. Wausau, Wis. Superior Window Company Miami, Florida Ware Laboratories, Inc. Miami, Fla.	Ventilator for Panel Window System 	45 3/4" x 25 3/4"		42 1/2" x 22 1/2"	

These sizes will be furnished in Glass-Seal Thermopane unless Metal-Seal is specified.

STEEL Detroit Steel Products Co.* Detroit, Mich. Truscon Steel Co. Youngstown, Ohio ALUMINUM Marmet Corp. Wausau, Wis. Superior Window Company Miami, Florida Ware Laboratories, Inc. Miami, Fla. *Detroit Steel Products manufactures a non-standard size ventilating unit.	9-Light Panel Wall  Awning Ventilator for 9-Light Panel Wall 	36" x 24"	34 1/16" x 22 1/16"		These sizes will be furnished in Glass-Seal Thermopane unless Metal-Seal is specified.
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Solar Air-Flo, Inc. Elkhart, Ind. Wisconsin Window Unit Co. Merrill, Wis.	Panel Wall with Louvers 	49 3/8" x 104"	45 1/2" x 25 1/2"		
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Fabrow Mfg. Co. Toledo 9, Ohio Fred Reuten, Inc. Closter, N. J. Wadsworth Millwork Co. Wadsworth, Ohio	Modified Panel Window (Wood) 	45 3/8" x 52"			*Except as follows: To be manufactured with 2 lights of 1/4" Plate and 1/2" Air Space; also, 2 lights of 3/8" Sheet and 1/2" Air Space.
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Standard Sizes for Farm Service Buildings

These 7/8"-thick Thermopane units for farm buildings are made with 3/4" sheet glass only and 1/2" air space only. They are stenciled for use in farm buildings.



1/2" Air Space and
3/4" Sheet Glass
only
36" x 44"
36" x 60"
40" x 68"

These 1/2"-thick units for farm buildings are made with double strength A-quality window glass only and 1/4" air space.



Studs 24" on center for fixed windows with stops nailed to studs

Five Sizes Below
1/4" Air Space
and DSA Glass
only
22" x 28"
22" x 36"

Steel sash manufactured by
Clay Equipment Corp., Cedar
Falls, Iowa. Thermopane units
1/2"-thick made only with
double strength A-quality
window glass only and 1/4" air
space.



32" x 36"

31 1/2" x 35 1/2"

32" x 36"

30 3/4" x 22"
(Top) Tilting
31 1/2" x 11 3/4"
(Bottom) Fixed

Sash for Non-standard Size Thermopane Units

Some representative sash manufacturers of different styles of windows are listed on this page. This listing does not purport to be a complete listing of manufacturers and styles, nor does it necessarily include all styles and sizes made by the listed manufacturers. Those shown have units which will accept $\frac{1}{2}$ " thick units of Thermopane and, in some instances, $\frac{3}{4}$ " thick units. Most have been approved by Libbey-Owens-Ford; some are undergoing approval tests. Because thickness tolerances, dimensional tolerances and edge clearances of Thermopane, and strength of sash, are important to satisfactory glazing, these factors should be carefully checked with the sash manufacturer before entering order for sash or Thermopane units.

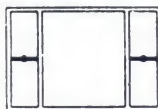
DOUBLE HUNG ALUMINUM WINDOWS

Adams & Westlake
Elkhart, Ind.
Cupples Products Co.
Maplewood, St. Louis 17,
Mo.
Flour City Ornamental Iron
Co., Minneapolis, 6 Minn.
Ceco Steel Products Corp.
Sterling Aluminum Window
Div., Chicago 50, Ill.



STEEL PICTURE WINDOW UNITS WITH FLANKING DOUBLE HUNG STEEL SASH

J. S. Thorn Co.
Philadelphia 32, Pa.
Truscon Steel Co.
Youngstown, Ohio



ALUMINUM FOLDING WINDOWS

Flour City Ornamental Iron
Co. Minneapolis 6, Minn.
Universal Corp.
Dallas 9, Texas



ALUMINUM AWNING WINDOWS

Ludman Corp.
Miami 28, Fla.
General Bronze Corp.
Garden City, Long Island,
N. Y.
Brown & Grist
Newport, News, Va.
Security Products Co.
St. Louis 4, Mo.
Ware Laboratories, Inc.
Miami, Fla.



ALUMINUM PROJECTED SASH

Wm. Bayley Co.
Springfield Ohio



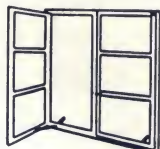
ALUMINUM REVERSIBLE WINDOWS

Adams & Westlake
Elkhart, Ind.
Gall Reversible Window Co.
Bedford, Ohio
Ware Laboratories, Inc.
Miami, Fla.



ALUMINUM CASEMENT WINDOWS

Reynolds Metal Co.
Louisville 1, Ky.
ABC Steel Equipment Co.
New York 10, N. Y.
Ware Laboratories, Inc.
Miami, Fla.



ALUMINUM HORIZONTAL SLIDING SASH

General Bronze Corp.
Garden City, Long Island,
Glide Windows, Inc.
N. Hollywood, Calif.



WOOD SPECIAL PIVOTED DOUBLE HUNG SASH

Williams Pivoted Sash Co.
Cleveland, Ohio



ALUMINUM SPECIAL SASH

Flour City Ornamental Iron
Co. Minneapolis 6, Minn.
General Bronze Corp.
Garden City, Long Island,
N. Y.
E. K. Geyser Co.
Pittsburgh 3, Pa.
Kesco Products, Inc.
Bristol, Ind.

ALUMINUM STOREFRONTS

Brasco Mfg. Co.
Harvey, Ill.
Kawneer Co.
Niles, Mich.
Natcor Storefronts Co.
Taunton, Mass.

ALUMINUM SLIDING DOORS STEEL

Bilt-Rite Aluminum Co.
Seattle, Washington
General Bronze Corp.
Garden City Long Island
Glide Windows, Inc.
N. Hollywood, Calif.
Panaview Co.
N. Hollywood, Calif.
Arcadia Metal Products Co.
Arcadia, California
Malibu Corporation
Los Angeles, California
Frank B. Miller Mfg. Co.
Burbank, California
Steel-Bilt, Inc.
Los Angeles 22, Calif.

DOUBLE HUNG STEEL WINDOWS

S. H. Pomeroy Co.*
New York 54, N. Y.

*These sash accept $\frac{1}{2}$ "
thick or $\frac{3}{4}$ " Thermopane.



Steel Sash

COMMERCIAL - ARCHITECTURAL - INDUSTRIAL

(Intermediate casements, projected, pivoted and combinations)

Sash manufacturers should be consulted while projects are still in the design stage to be sure Thermopane can be used.

In steel sash, the metalized edge will show in some instances. Some sash will accept $\frac{3}{4}$ " thick units of Thermopane as well as $\frac{1}{2}$ " thick units.

Wm. Bayley Co.
Springfield, Ohio
Bliss Steel Products Co.
E. Syracuse, N. Y.

Bogert & Carrough Co.
Paterson, N. J.
Ceco Steel Products Co.
Chicago 50, Ill.
Copco Steel & Mfg. Co.
Detroit 27, Mich.

Detroit Steel Products Co.
Detroit Mich.
Druwhit Metal Products Co.
Los Angeles 11, Calif.
Michael Flynn Mfg Co.
Philadelphia 24, Pa.

Hopes' Windows, Inc.
Jamestown, N. Y.
Mesker Bros.
St. Louis, Mo.
Soule Steel Co.
San Francisco 24, Calif.

J. S. Thorn Co.
Philadelphia 32, Pa.
Truscon Steel Co.
Youngstown, Ohio

Heat Transmission Table

The over-all heat transmission coefficient U varies with the ranges of temperature at which the coefficient is determined. For most practical heat loss calculations, coefficient U is the value determined at ten degrees outside temperature, 70 degrees inside temperature, 15 mph outside air velocity, 0.25 mph average inside air velocity. The following table gives such values from actual tests with glass sizes 30" x 30":

Number of Panels	Glass Thickness	U Value		
		Air Space		
		None	1/4"	1/2"
Single Glass	1/8"	1.16		
	1/4"	1.15		
Double Thermopane (one air space)	1/8" or 1/4"		.65	.58
Triple Thermopane (two air spaces)	1/4"		.47	

Reduction of Cooling Load

Thermopane in many cases reduces the size and cost of air conditioning equipment and provides a saving in over-all cost of operation of the air cooling system. The amount saved will depend largely on the window orientation and will be increased by the use of Thermopane, made with any type of heat absorbing glass, where the windows are exposed to direct sunshine.

Suggested Specifications

All insulating glass shall be double Thermopane of sizes indicated on the drawings and composed of an innerpane of glass inches thick and an outerpane of glass inches thick, hermetically-sealed with a metal-to-glass bond and separated by a (1/4" or 1/2") dehydrated air space, or glass edge sealed (1/4" air), as manufactured by Libbey-Owens-Ford Glass Company, Toledo, Ohio, and installed according to manufacturer's instructions.

FOR COMPLETE TECHNICAL DATA, ASK FOR A COPY OF THERMOPANE MANUAL

Chart for Specifying Non-Standard Size Units of Double Thermopane for Buildings Types, Sizes, Thicknesses, Tolerances and Weights

Type of Glass	Min. Size 1/4" or 1/2" Air Space	Maximum Size With 1/4" Air Space*	Maximum Size With 1/2" Air Space*	Thickness Range		Dimensional Tolerance	Approx. Average Net Wt. per Sq.Ft.
				1/4" Air Space	1/2" Air Space		
D.S.A. (Window Glass) 1/8" Blue Ridge Hammered 1/8" Blue Ridge Velvex 1/8" Blue Ridge Flutex 1/8" Blue Ridge Hammered Aklo 1/8" Polished Plate 1/8" Heat Absorbing Plate	8" x 8"	Maximum Dimensions 38" and 76" Within a maximum total area of 1700 square inches. **See footnote.	Maximum Dimensions 24" and 76" Within a maximum total area of 1700 square inches. **See footnote.	7/16" to 9/16"	11/16" to 13/16"	8" to 38" high to 48" wide ± 1/16" 48" to 76" wide + 1/8" - 1/16"	3 1/4 lbs.
3/16" A Sheet (Window Glass)	8" x 8"	Maximum Dimensions 50" and 76" Within a maximum total area of 3200 square inches. *See footnote	Maximum Dimensions 50" and 76" Within a maximum total area of 3200 square inches. *See footnote	9/16" to 11/16"	13/16" to 15/16"		5 lbs.
1/4" Polished Plate 1/4" Heat Absorbing Plate	8" x 8"	Maximum Dimensions 48" and 132" Within a maximum total area of 4800 square inches. **See footnote	Maximum Dimensions 98" and 132" Within a maximum total area of 9600 square inches. **See footnote	11/16" to 13/16"	15/16" to 1 1/16"	8" to 36" high + 1/8" - 1/16"	6 1/2 lbs.
7/32" Blue Ridge Hammered 7/32" Blue Ridge Velvex 7/32" Blue Ridge Flutex 1/4" Blue Ridge Hammered Aklo	8" x 8" 8" x 8"	48" x 100" 42" x 100"	48" x 100" 42" x 100"	7/8" to 3/4" 5/8" to 3/4"	7/8" to 1" 7/8" to 1"	36" to 98" high + 3/16" - 1/16"	6 1/4 lbs.
1/4" Tuf-flex Polished Plate 1/4" Tuf-flex Heat Absorb- Plate	8" x 8"	40" x 48"	40" x 48"	11/16" to 7/8"	13/16" to 1 1/8"		6 1/2 lbs.

*For building exteriors, all Thermopane units with one dimension 48" or less can be manufactured with either 1/4" or 1/2" air space. When both dimensions exceed 48" the units will be manufactured with 1/2" air space only. For units up to 16", but not including 16" on one dimension and when the second dimension is more than 4 1/2 times greater than the first, submit for consideration and price.

**NOTE: IMPORTANT Note carefully maximum size limitations because the total square inches govern the maximum widths and heights. For example, when a double Thermopane unit is manufactured of Polished Plate 1/4" and 1/2" air space, and the size is 72" in one dimension then the other dimension cannot be over 132" to be within the 9600 square inches or 67 square feet total area. This would hold true on a unit 82" x 116" and 98" x 98". A unit 98" x 132" could not be furnished as it totals 12,836 square inches. The same principle holds true for both double and triple sizes noted above by the double asterisk.

Vitrolite[®] Structural Glass

Vitrolite is opaque structural glass, $\frac{1}{32}$ " or more in thickness, which can be applied to walls and other vertical or horizontal areas except floors. It offers a practical means of attaining unusual beauty—colorful beauty that is preserved by characteristics inherent in glass.

Vitrolite is opaque, homogeneous, non-absorbent, and impervious to moisture. It possesses high tensile and crushing strength, and is highly resistant to abrasion. Vitrolite will not warp, swell, shrink or craze. Liquids in common use cannot penetrate it, and it will not absorb liquids or gases that give off unpleasant odors. It is not easily stained and will not burn. It is difficult to write or mark upon, and is easily cleaned by the whisk of a damp cloth—or, in extreme cases, by the application of soap and water. Vitrolite has slight variations in shade and cannot be guaranteed to match exactly.

Libbey-Owens-Ford Vitrolite is installed in interiors with Vitro-cement. Joints are buttered with joint cement. For exterior installation, it is attached with asphaltic mastic and supported at the lower edge adjoining sidewalk and at horizontal joints by metal members having facing shapes that overlap the Vitrolite. All joints on exteriors should be $\frac{1}{16}$ ", butted and pointed with joint cement.

Direct contact with metal, concrete, or other hard substances should be avoided and a cushioning material should always be provided. Abutting edges ground and chamfered, exposed edges polished and chamfered or finished with quarter round. Avoid sharp mitered corners. Corners subjected to rough usage should have metal guards. The Vitrolite at the extremities of a storefront installation should be protected with a suitable metal member. Top courses should have projecting member of metal or other material provided with a drip. Distance from back-ground wall or surface to face of Vitrolite, $\frac{5}{8}$ " to $\frac{3}{4}$ " for $\frac{1}{32}$ " Vitrolite, $\frac{3}{4}$ " to $\frac{7}{8}$ " for $\frac{1}{16}$ " Vitrolite. Details and specifications for construction available upon request.

Uses

Facing of storefronts and exteriors of buildings. Lobbies of hotels and office buildings. Wainscoting and partitions for corridors, washrooms, toilets, and shower baths in public buildings. In homes—for wainscoting of bathrooms, kitchens, breakfast rooms and splash panels. For walls, ceilings, and wainscoting in laboratories and dairies and breweries. In hospitals—for operating rooms, diet kitchens, laboratories and bathrooms. Wainscoting and display fixtures in bakeries, meat markets and candy stores. Industrial worktable tops for handling of food, sorting, spotting, etc. Wainscoting and mirror cases in barber shops.

Bent Glass

Most bent glass shapes are produced by causing flat glass to form in a mould by the action of heat and gravity only. It is not a machined product, and is subject to more distortion and wider tolerances than flat polished plate or window glass.

Explanation of Diagrams

Dimensions on diagrams are to illustrate maximum limits of proportions. Radii of curves may not be less than 6". Radii should be specified to outside surface of glass. Maximum rise of bends J and K must not exceed 36". Depth of G bends not to exceed 1 in 16; example, pane 64", depth 4". Flat portions of bent glass cannot be kept entirely flat where large flat areas are required. It is recommended that flat portions be ordered as separate lights. It is recommended that bent Vitrolite panels should not exceed 6 sq. ft. in area for exterior work. For Vitrolite or Blue Ridge Glass specify which face of glass is concave or convex. Requirements for bends in glass of greater thicknesses than listed at right or for sizes in excess of the maximum dimensions listed should be submitted for consideration.

Maximum Sizes of Bends (in inches)*

Types A, B, C, D, E, F, H, J			
	Girth	Height	
Regular Plate			
$\frac{1}{8}$ "	60 or 48	48 or 60	
$\frac{1}{4}$ "	144 or 120	120 or 144	
Color Clear			
$\frac{1}{8}$ "	40	60	
$\frac{1}{4}$ "	70	140	
Colored			
$\frac{7}{32}$ "	90	116	
Golden	90	116	
Heat Absorbing	100 or 144	144 or 100	
Single Strength	24	48	
Double Strength	60 or 48	48 or 60	
Heavy Sheet			
$\frac{3}{16}$ "	60	84	
$\frac{7}{32}$ "	84	96	
Blue Ridge			
$\frac{1}{8}$ "	60 or 48	48 or 60	
$\frac{7}{32}$ "	84 or 48	48 or 84	
Vitrolite			
$\frac{11}{32}$ "	48	48	
$\frac{7}{16}$ "	48	48	
Types G, K, L			
Same As Above Except			
Regular Plate			
$\frac{1}{4}$ "	110	144	

*36 inch maximum rise regardless of type of bend.



Gleaming walls of Vitrolite retain their luster for years. Vitrolite is particularly suited for use in bathrooms, kitchens, corridors, store fronts, etc., because of the ease with which it is cleaned and its long-lived beauty.

Suggested Specifications

All structural glass shall be Vitrolite, (.....) thick, of (.....) color, (in thickness, size and colors indicated on the drawing) as manufactured by Libbey-Owens-Ford Glass Company.

Chart for Specifying Vitrolite

COLORS	Thickness	Thickness Tolerance	Lbs. Per Sq. Ft.	Finish
White	1 1/32"	± 1/32"	4.4	ALL COLORS GROUND AND POLISHED
	7/16"	± 1/32"	5.6	
Jade	1 1/32"	± 1/32"	4.4	
Light Gray	1 1/32"	± 1/32"	4.4	
Taupe	1 1/32"	± 1/32"	4.4	
Alamo Tan	1 1/32"	± 1/32"	4.4	
Cadet Blue	1 1/32"	± 1/32"	4.4	
Red	1 1/32"	± 1/32"	4.4	
Dark Gray	1 1/32"	± 1/32"	4.4	
Cactus Green	1 1/32"	± 1/32"	4.4	
Black	1 1/32"	± 1/32"	4.4	
	7/16"	± 1/32"	5.6	
	3/4"	± 1/32"	10.2	

Stock Sizes of Ashlars

8" x 12", 8" x 16", 12" x 16", 16" x 16", 24" x 24".

Size Limitations Recommended:

Store Fronts: 6 square feet.

Bathroom Walls: 8" x 12" to 24" x 24".

Kitchen Walls: 8" x 12" to 24" x 24".

Commercial Buildings (Interior Walls): Up to 30" x 36".

Toilet Partitions: Up to 60" x 60".

Vitrolite Colors are available subject to stocks on hand or additional manufacture. Vitrolite has slight variations in shade and cannot be guaranteed to match exactly.

For additional information, ask for Catalog V-129.

Uses

Bent glass is used in store fronts, show windows, store front bulkheads and facades, display cases. The use of bent Vitrolite enables one to maintain a functional and pleasing architectural design as shown in the photo below where the Vitrolite is curved to conform to the bent glass above it.



Marcus P. Miller and Frederic R. Frankel, Architects

The attractive lines which bent polished plate glass give to this functional store front in Tucson, Ariz., are shown in this photo. Bent glass "leads" customers to door.

Suggested Specifications for Bent Glass

All bent glass shall be Libbey-Owens-Ford (polished plate, window glass, Vitrolite or Blue Ridge glass), as defined by Federal Specification DD-G-451a, in thicknesses, sizes and color as shown on the drawings.

Decoration on Glass

Libbey-Owens-Ford offers three types of sandblast decorative finish on Vitrolite, polished plate and Blue Ridge glass. They are:

surface sandblast—Uniform sandblasting over all or part of glass, in grades from very slight to complete removal of polished surface.

shaded sandblast—Gradations of shading ranging from natural surface to complete obscuration of polish.

deep sandblast—Decoration cut below surface of glass but without modeling or gradation.

Blue Ridge Glass Libbey-Owens-Ford is sales agent in the United States and Canada for Blue Ridge Glass Corporation, manufacturer of glass



A partition of Flutex Glass provides privacy as desired and still admits light. Designer: S. S. Silver & Co. New York, N. Y.

in a wide range of patterns and characteristics. Basically, Blue Ridge Glass is of two types: (1) *Patterned Glass*—described on pages 18-21 and (2) *Aklo® Glass*—a heat absorbing glass described on pages 22 and 23.

Patterned Glass

Blue Ridge Patterned Glass is semitransparent, with distinctive geometric or linear designs on one or both surfaces to provide diffused light transmission with various degrees of privacy, and to meet special requirements in decorative or functional uses. Five of the patterns are made in Wire Glass for greater resistance to fire hazards. The four most popular decorative patterns are illustrated on page 19; thirteen others on pages 20 and 21.

FINISHES—Five types of surface finish are available:

1. **PLAIN ROLLED FIRE FINISH**—clear surfaces as they come from the lehr without further treatment.
2. **SATINOL® FINISH**—treatment of one or both surfaces provides a soft satin-like appearance, increases obscurity, and spreads transmitted light uniformly over a wide area. Does not finger mark or collect dust and dirt. Easily cleaned with a dry or damp cloth.
3. **FROSTED FINISH**—acid etching of one or both glass surfaces to improve distribution of transmitted light and to reduce glare. *Not recommended for partitions or any other decorative use.*
4. **SANDBLASTED FINISH**—increases obscurity and diffuses transmitted light very well but it is much harder to

clean than *Satinol*. Reduces light transmission by as much as 30% if applied to both surfaces of the glass.

5. **TEXTURED FINISH**—a stippled surface rolled into one side to “soften” the linear pattern and to provide increased obscurity midway between Plain Rolled Fire Finish (clear) and *Satinol* Finish. Now available in Flutex and Linex patterns only.

Processes

1. **SECURIT®**—practically all Blue Ridge Patterned Glass (unwired) exceeding $\frac{1}{8}$ " thickness may be Securitized (heat-tempered) for increased resistance to thermal and physical shock. For data see pages 24 and 25.
2. **BENDING**—Blue Ridge Glass may be bent for special purposes and decorative effects. For dimensional limitations and other data see pages 16 and 17.

USES—Residences, stores, hotels, offices and industrial buildings—for windows, doors, partitions, transoms, skylights, decorative panels, cupboard doors, shelving backgrounds, displays, signs and lighting fixtures. An ideal partition material. It transmits diffused light, guards privacy by obstructing vision, decorates two rooms at one time. A completely finished surface that requires no upkeep to maintain its new appearance.

SUGGESTED SPECIFICATIONS—All Blue Ridge Glass conforms with Federal Specification DD-G-451a.

“Where Patterned or Polished Wire or Obscure Glass is specified herein, or shown on plans, it shall be () inches in thickness and shall be () pattern (if wired, specify type), and shall be manufactured by the Blue Ridge Glass Corporation.”
If a surface other than Plain Rolled Fire Finish is desired, the type of finish, such as *Satinol* or Frosted, should be specified. If increased resistance to thermal and physical shock is desired, specify *Securit* processing.

The Standard *Satinol* or Frosted (Glare Reducing) Finish Specification is: “Where Patterned or Obscure Glass is specified herein or shown on plans, it shall be () inches in thickness and shall be () pattern *Satinol* (one or both surfaces) or have Frosted (Glare Reducing) finish on one or both surfaces, and each light shall bear the label of Blue Ridge Glass Corp.”



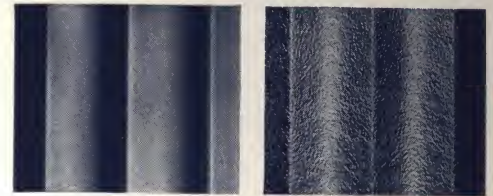
A partition of Doublex Glass permits light to be “borrowed” from another room but helps to maintain privacy.

Flutex

Uses

Decorative interior and exterior glazing, particularly windows, partitions and doors.

MAXIMUM WIDTH AND LENGTH MANUFACTURED					
Approx. Lt. Trans.* Plain Rolled Fire Finish (Unwired)	Thickness	Plain Rolled Fire Finish†	Satinol*†	Textured†	Approx. Net Weight Sq. Ft.
89%	1/8"	54"x132"	54"x132" (1 side only)	54"x132"	1 3/4 lbs.
	7/32"	54"x136"	54"x136"	54"x136"	2 3/4 lbs.



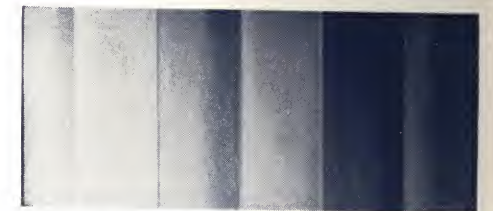
(Cross section shows actual size). 1" convex flutes, sharp definitive pattern. Relatively transparent in Plain Rolled Fire Finish (clear). Textured and Satinol finishes increase obscurity and diffusion.

Louvre

Uses

Decorative interior and exterior glazing, particularly windows, partitions and doors.

90.4%	1/8"	54"x132"	54"x132" (1 side only)	1 3/4 lbs.
	7/32"	54"x136"	54"x136"	2 3/4 lbs.



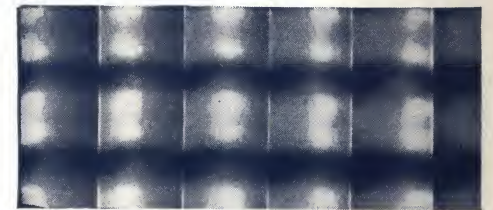
(Cross section shows actual size). Alternate 1" angular planes resemble louvers in venetian blinds. Relatively transparent in Plain Rolled Fire Finish (clear). Satinol finish increases obscurity and diffusion.

Doublex

Uses

Decorative interior and exterior glazing. Widely used for partitions, screens, illuminated wall panels, obscured windows, cupboard doors. Sets up striking light patterns.

87%	7/32"	54"x136"	54"x136" (1 side only)	2 3/4 lbs.
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(Cross section shows actual size). A 1" checkered pattern with flutes on one surface running at right angles to the corrugations on other side. Very good diffusion and obscurity, especially when Satinol-finished.

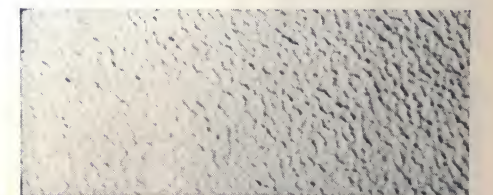
Muralex

Finely engraved, fairly obscure all-over pattern. Medium distribution of light at moderate angle. Rich looking. Easy to clean.

Uses

For distinctive effects in partitions, doors, transoms, walls, ceiling lights.

86%	1/8"	48"x132"	48"x132" (1 side only)	1 3/4 lbs.
	7/32"	48"x136"	48"x136"	2 3/4 lbs.
	3/8"	60"x144"	60"x144"	5 lbs.



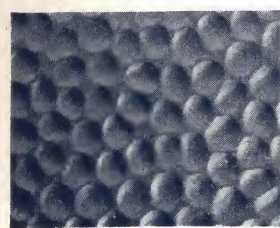
*Satinol on one surface decreases light transmission approximately 3% — both surfaces approximately 6%. Frosting decreases light transmission approximately 15 to 20%.
†Some patterns available in widths up to 60" depending upon stocks on hand, but maximum width of Frosted finish is 48" regardless of glass pattern.

Other Popular Patterned Glass The thirteen patterns shown here provide a wide selection to meet varied requirements as to appearance, light transmission, diffusion and obscurity. Although attractive, they are somewhat less popular as a deco-

orative medium than the four patterns shown on the preceding page. However, some patterns are particularly suitable for special decorative effects, as a review of their illustrations and descriptions will prove. Five of the patterns are available in wire glass—see the table on page 25.

(All patterns are shown actual size)

MAXIMUM WIDTH AND LENGTH MANUFACTURED

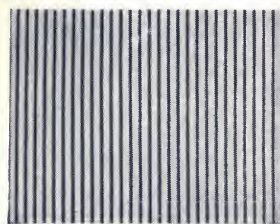


Hammered An all-over series of raised, adjacent lenses that diffuse light at a moderate angle in all directions.

Uses Popular for industrial glazing, both interior and exterior.

90%

Approx. Lt. Trans.† Plain Rolled Fire Finish (Unwired)	Thickness	Plain, Rolled Fire Finish†	Satinol*†	Frosted*†	Approx. Net Weight Sq. Ft.
90%	1/8"	48"x132"	48"x132" (1 side only)	48"x132"	1 3/4 lbs.
	3/32"	48"x136"	48"x136"	48"x136"	2 3/4 lbs.
	3/16"	48"x100"	48"x100"	48"x100"	5 lbs.
	1/2"	48"x100"	48"x100"	48"x100"	6 lbs.

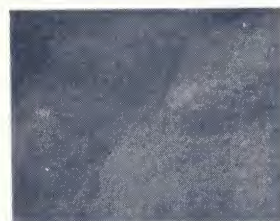


Ribbed Approximately twenty-one fine parallel ribs per inch spread light along one axis only, perpendicular to ribs.

Uses Mainly for factory glazing.

84.4%

84.4%	1/8"	48"x132"	48"x132" (1 side only)	48"x132"	1 3/4 lbs.
	3/32"	48"x136"	48"x136"	48"x136"	2 3/4 lbs.
	3/16"	48"x100"	48"x100"	48"x100"	5 lbs.
	1/2"	48"x100"	48"x100"	48"x100"	6 lbs.



Luminex Almost transparent, high light transmission but only slight diffusion.

Uses For industrial plants or commercial glazing where maximum light is desired. When *Satinol*-finished, attractive for partitions.

88.4%

88.4%	1/8"	48"x132"	48"x132" (1 side only)	48"x132" (2 sides only)	1 3/4 lbs.
	3/32"	48"x136"	48"x136"	48"x136" (2 sides only)	2 3/4 lbs.

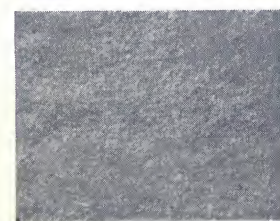


Skytex Eight parallel ribs per inch diffuse light perpendicularly to direction of ribs and drain off condensation. Usually glazed with ribs vertical.

Uses Ideal for skylights; equally suitable for industrial glazing, fluorescent fixtures.

78.9%

78.9%	1/8"	48"x132"	48"x132" (Flat side only)	48"x132"	1 3/4 lbs.
	3/32"	48"x136"	48"x136" (Flat side only)	48"x136"	2 3/4 lbs.

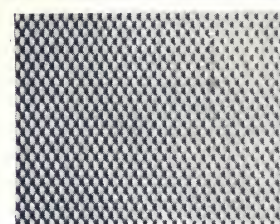


Velvex A semitransparent glass with a shallow pattern—only slightly diffusing.

Uses Popular for interiors — doors, partitions, transoms and shower stalls. *Satinol* finishing adds obscurity, provides excellent diffusion.

89%

89%	1/8"	48"x132"	48"x132" (1 side only)	48"x132" (2 sides only)	1 3/4 lbs.
	3/32"	48"x136"	48"x136"	48"x136" (2 sides only)	2 3/4 lbs.



Industrex Tiny lens-shaped figures diffuse light over wide area. Easily cleaned.

Uses Primarily factories. Suitable for some commercial structures but not partitions in offices, hospitals, etc.

88.2%

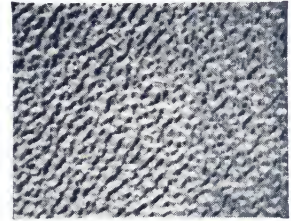
88.2%	1/8"	48"x132"	48"x132" (1 side only)	48"x132"	1 3/4 lbs.
	3/32"	48"x136"	48"x136"	48"x136"	2 3/4 lbs.

**Satinol* on one surface decreases light transmission approximately 3%—both surfaces approximately 6%. Frosting decreases light transmission approximately 15 to 20%.
†Some patterns available in widths up to 60" depending upon stocks on hand, but maximum width of Frosted finish is 48" regardless of glass pattern.
*†*Satinol* 1 Surface is on smooth side of glass.
*†Frosting 1 Surface is on patterned side of glass.
*†Frosting 1 Surface—maximum width is 44 inches.

(All patterns are shown actual size)

Fine-Tex A fine texture pattern for glazing industrial buildings—provides medium distribution of light and is easy to clean.

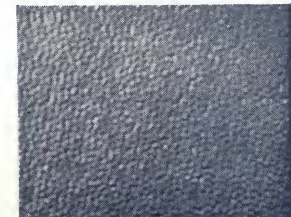
Approx. Lt. Trans.* Plain Rolled Fire Finish (Unwired)	Thickness	MAXIMUM WIDTH AND LENGTH MANUFACTURED				Approx. Net Weight Sq. Ft.
		Plain Rolled Fire Finish†	Satinol*†	Frosted*†	Textured‡	
89%	1/8"	48"x132"	.	48"x132"		1 3/4 lbs.



Pointex Nearly transparent. Allover pattern of tiny irregularly-sized bosses. Made only in thin 1/8" thickness.

Uses Interior glazing requiring thin, non-diffusing glass. When Frosted, excellent for lighting fixtures and signs.

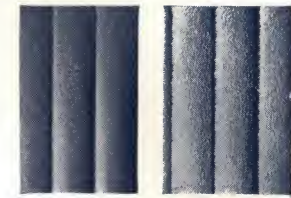
92.5%	1/8" (thin)	48"x120"		48"x120" (2 sides only)		1 1/2 lbs.
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Linex

Uses Decorative interior and exterior glazing. Particularly attractive in any location where narrow, ribbon-like effect is desired. (Frosted finish is effective in lighting fixtures but it is not recommended for decorative uses such as partitions, doors, etc.)

80%	1/8"	54"x132"		48"x132" (2 sides only)	54"x132"	1 3/4 lbs.
	7/32"	54"x136"	54"x136" (flat side only)	48"x136" (2 sides only)	54"x136"	2 3/4 lbs.



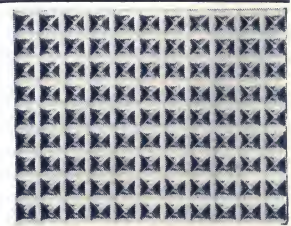
Plain

Textured

Reglex 64 pyramidal-shaped indentations to the square inch diffuse light very well in a cross-shaped light pattern; highly obscure.

Uses Interior and exterior glazing, especially effective in doors and partitions.

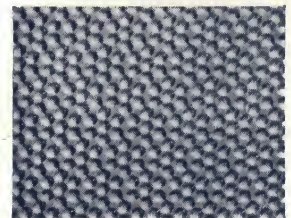
52.3%	1/8"	48"x132"	48"x132" (1 side only)			1 3/4 lbs.
	7/32"	48"x136"	48"x136"			2 3/4 lbs.



Diffusex Small, slightly elevated lenses provide uniform illumination, moderate angle of diffusion. Lenses are spaced to avoid dirt-collecting pockets; easily cleaned.

Uses Interior or exterior. For walls, partitions, transoms in offices, factories.

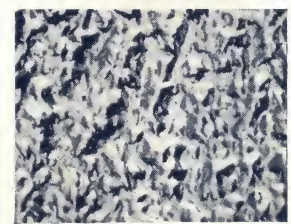
87.6%	1/8"	48"x132"	48"x132" (1 side only)			1 3/4 lbs.
	7/32"	48"x136"	48"x136"			2 3/4 lbs.



Pebblex Deeply imprinted, irregular pebble design. Highly obscure. Unusually brilliant appearance. Diffuses light at wide angles.

Uses Well-lighted privacy for office partitions and general interior glazing.

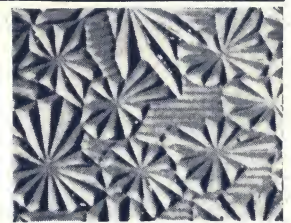
79.7%	1/8"	48"x132"	48"x132" (1 side only)			1 3/4 lbs.
	7/32"	48"x136"	48"x136"			2 3/4 lbs.



Florex A graceful floral pattern of unusual brilliance without dirt-collecting sharp grooves or corners.

Uses Interior glazing — partitions, transoms, doors and windows.

86.2%	1/8"	48"x132"	48"x132" (1 side only)			1 3/4 lbs.
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*Satinol on one surface decreases light transmission approximately 3%—both surfaces approximately 6%. Frosted decreases light transmission approximately 15 to 20%.
†Some patterns available in widths up to 60" depending upon stocks on hand, but maximum width of Frosted finish is 48" regardless of glass pattern.
*†Satinol 1 Surface is on smooth side of glass.
*†Frosted 1 Surface is on patterned side of glass.
*†Frosted 1 Surface—maximum width is 44 inches.

Aklo® Glare-Reducing and Heat Absorbing Glass

COLOR—Soft, blue-green, much like better-quality sunglasses. Maximum daylight transmission of Aklo Glass is in that portion of the spectrum most restful to the eyes—blue, green, yellow—nature's most prevalent colors. The resulting Filtered Daylight fulfills the fundamental requirement of good illumination—a higher quality of lighting which makes seeing easier and reduces eye fatigue. Due to the special composition of Aklo Glass some color variation may occur.

GLARE REDUCTION—To obtain maximum eye comfort, Aklo Glass must be frosted. The result is more uniformly diffused daylight, subdued brightness. This means less eye fatigue, better seeing, happier personnel—with resulting improvement of quality of work and fewer accidents.

EXCLUDES SOLAR HEAT—Aklo Glass absorbs practically all of the heat-loaded infra-red rays of the sun. This heat is dissipated, much of it externally, so that incoming solar heat is substantially reduced. The result is a cooler interior—more comfort, less material spoilage, lower air-conditioning costs. See charts at right.

LOWER EXPANSION—Any glass that absorbs heat becomes much hotter than ordinary glass. Sudden cooling by rain or hail may cause breakage unless the glass is of low expansion. Blue Ridge Aklo Glass has this all-important property of resisting thermal shock—about 25% greater than diffusing patterned or wire glass. This means lower maintenance costs.

PATTERNS—Blue Ridge Aklo Glass is made in Hammered and Fine-Tex Patterns (unwired) and in Hammered, Fine-Tex and Skytex Patterns (wired).

SUGGESTED SPECIFICATION—To combine glare reduction and solar heat exclusion, specify "Frosted Aklo ¼" thick (Hammered or Fine-Tex wired or unwired) or (Skytex-wired). All other skylights and windows facing north or in permanent shade and designated on the drawings to receive obscure glass shall be glazed with non-heat-absorbing glass of the patterns, thicknesses and types indicated herein".

Blue Ridge Aklo Glass conforms with Federal Specification DD-G-451a. Aklo Wire Glass longer than 60" should not be used under any circumstances.

Complete information on Aklo glare-reducing and heat-absorbing glass can be found in Sweet's Plant Engineering File.

Note: Due to special composition of Aklo Polished Wire Glass it will contain imperfections not allowable in non-heat-absorbing Polished Wire Glass.



Workers enjoy Filtered Daylight for precision work in the plant of the Richmond Auto Parts Company of Richmond, Va.



Aklo reduces sun heat in this laundry. Designed and constructed under supervision of Dept. of Public Works, City of New York.

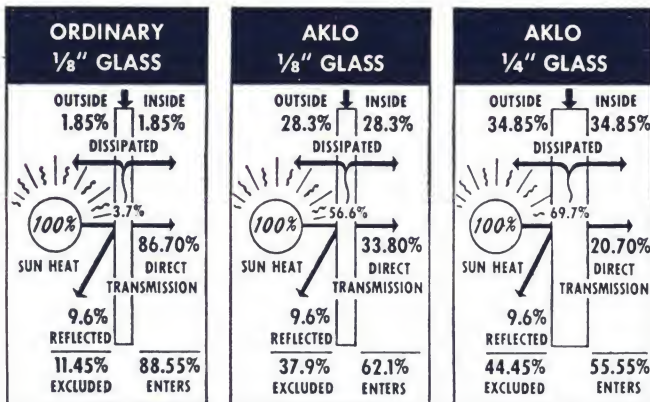


Office, factory, school—where critical seeing or long use of eyes is practiced—specify Frosted Aklo. Nu-Car Carriers, Metuchen, N. J.



With this portable Radiometer Kit your L-O-F Glass Distributor or our district representative will gladly demonstrate—in your own office—the effectiveness of Aklo Glass.

How Aklo Glass Reduces Incoming Sun Heat

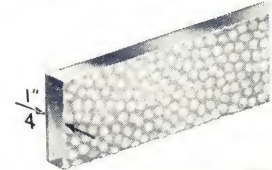


Blue Ridge Aklo Glass is a practical and economical answer to the problem of heat reduction. The charts above show how it dissipates absorbed solar heat to the outdoors. Note how much more sun heat is filtered out by Aklo Glass than by ordinary glass of equal thickness. More than three times as much sun heat is excluded.

HOW TO SELECT THE RIGHT Aklo Glass

Determine the relative importance of glare reduction, heat exclusion and maximum light transmission. Then your decision can be based on these recommendations:

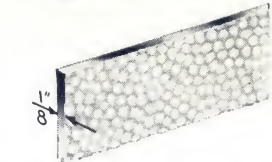
For maximum heat exclusion only—use 1/4" Aklo Glass.



For maximum comfort—minimum heat and glare—use 1/4" FROSTED Aklo Glass.



For heat exclusion with maximum light transmission—use 1/8" Aklo Glass.



Comparative Qualities of Aklo and Ordinary (non-heat-absorbing) Glass

Thickness and kind of Glass	Heat			Efficiency Ratio of heat passing directly through glass to light transmission
	Total Heat of Sun Entering Room Through Glass			
	Reradiated by the glass	Transmitted directly through glass	Total heat entering through the glass	
HAMMERED PATTERN				
1/8" Aklo Glass—Unwired.....	28.30°C	33.80°C	62.10°C	1 : 1.87
1/8" Ordinary Glass—Unwired.....	1.85	86.70	88.55	1 : 1.03
1/8" Frosted Aklo Glass—Unwired.....	34.00	23.00	57.00	1 : 1.87
1/4" Aklo Glass—Unwired.....	34.85	20.70	55.55	1 : 2.58
1/4" Ordinary Glass—Unwired.....	3.70	83.00	86.70	1 : 1.07
1/4" Aklo Glass—Wired.....	35.70	19.00	54.70	1 : 2.57
1/4" Ordinary Glass—Wired.....	5.60	79.20	84.80	1 : 1.07
1/4" Frosted Aklo Glass.....	38.70	13.60	52.30	1 : 2.58
FOR COMPARISON ONLY				
1/8" Aklo Glass—Polished.....	27.00	38.00	65.00	1 : 1.87
1/8" Ordinary Glass—Polished.....	1.85	88.30	90.15	1 : 1.03
1/4" Aklo Glass—Polished.....	35.50	21.00	56.50	1 : 2.57
1/4" Ordinary Glass—Polished.....	3.75	84.50	88.25	1 : 1.07

Maximum Width and Length Manufactured

(Aklo Wire Glass longer than 60" should not be used under any circumstances.)

Product	Thickness	Plain Rolled Fire Finish	Gr. & Pol. Both Surfaces	Frosted*	Satinol	Approx. Net Weight Sq. Ft.
Aklo—HAMMERED & FINE-TEX	unwired 1/8"	42"x132"		2 sides 42"x132" 1 side 38"x132"	42"x132" (Ham. side only)	1 3/4 lbs.
	unwired 1/4"	42"x136"		2 sides 42"x136" 1 side 38"x136"	42"x136" (Ham. side only)	3 lbs.
HAMMERED & FINE-TEX	wired 1/4"	40"x144"		2 sides 40"x144" 1 side 38"x144"	40"x144" (patt. side only)	3 1/2 lbs.
SKYTEX	wired 1/4"	24"x144"		24"x144"		3 1/2 lbs.
Aklo—POLISHED WIRE	1/4"		24"x 60"			3 1/2 lbs.

*For maximum comfort—minimum heat and glare—specify 1/4" Frosted Aklo Hammered or Fine-TEX pattern.
Note: Frosting 1 Surface — maximum width 4" narrower than 2 surface sizes shown in table.

Blue Ridge Wire Glass

DESCRIPTION—A continuous process wire glass wherein the mesh is chromium dipped to insure both clean wire and firmer adhesion of the glass to the wire. To insure greater strength, wire is embedded as closely as possible to the center of the glass.

Polished Wire Glass is described in column at right. On page 20 will be found descriptions of Hammered, Ribbed, Luminex, Skytex and Industrex Patterned Glass. These patterns are produced either with or without wire. For information on Aklo Heat Absorbing Glass, wired and unwired, see pages 22 and 23.

APPROVED FIRE RETARDANT—Blue Ridge Wire Glass is an approved fire retardant, bearing number R-2129 of Underwriters' Laboratories, Inc. The rules of the National Board of Fire Underwriters limit the size of wire glass which can be glazed in openings exposed to fire hazard. In no case shall the unsupported area of the glass measure more than 48 inches in either dimension or exceed 720 square inches (5 sq. ft.). Typical maximum sizes which satisfactorily meet that requirement are 15 x 48, 18 x 40, 20 x 36 and 24 x 30 inches. It should also be noted that wire glass used for this purpose must be set in noninflammable materials.

For openings which are not subject to N.B.F.U. rules, maximum satisfaction will be obtained by limiting the length of the glass to 60 inches.

POLISHED WIRE GLASS—Used in all openings where clear vision and the security of non-scatterable, fire-retardant glass are desired. Note that wire is clean—no bubbles to mar the sharp outline or distort the vision.

Approved fire retardant bearing number R-2129 of Underwriters' Laboratories, Inc.



Hexagonal Mesh



Nuweld Mesh
(Polished Wire Only)

Blue Ridge Securit* Patterned Glass

DESCRIPTION—Securit is made by subjecting Blue Ridge Patterned Glass, which has been annealed in the regular manner, to a special process of heat treatment and rapid cooling that creates a highly compressed zone at the outer surface. The tensile strength of Securit, as determined by its modulus of rupture, is from three to five times greater than "non-Securitized" glass of similar pattern and thickness. When the limit of its strength is reached, Securit disintegrates into small, rounded, relatively smooth particles. Note: Patterned Glass 1/8" thick and Wire Glass cannot be Securitized.

In addition to its greater strength, Securit is extremely resistant to temperature variations which may affect a whole sheet, or only portions.

ADVANTAGES—Due to its special heat treatment, Securit Blue Ridge Patterned Glass possesses the following advantages:

1. Three to five times stronger than "non-Securitized" patterned glass.
2. Withstands impact shock far beyond the limits of ordinary rolled glass.

3. More resistant to thermal shock.
4. A safer glass for, when it does break, it disintegrates into small, diced particles.

Uses

Office doors or partitions which are subjected to considerable slamming or bumping.
Lighting fixture diffusing glass, and lenses for lamps.
Ceiling sash or sub-skylights.
Tops for cutting tables or counters.
Push plates and kick plates.
Commercial and residential shelving.
Guards around areas subjected to intense heat.
Balustrades and stair railings.
Windows frequently broken by impact.
Bath tub enclosures and shower doors.

With its special physical qualities, numerous patterns and surface treatments, Securit is a versatile product. Practical uses are being found for it almost daily. We welcome inquiries from architects and opportunities to solve their problems.

*®

Maximum Width and Length Manufactured

Pattern and Approx. Light Trans.* 1/4" Thickness	Thickness	Plain Rolled Fire Finish†	Gr. & Pol. Both Surfaces	Satinol*†	Frosted*†	Approx. Net Weight Sq. Ft.
HAMMERED	1/4"	48"x144"		48"x144"	48"x144"	3 1/2 lbs.
84%	3/8"	48"x120"		48"x120"	48"x120"	5 lbs.
	1/2"	48"x100"		48"x100"	48"x100"	6 1/2 lbs.
RIBBED	1/4"	48"x144"		48"x144"	48"x144"	3 1/2 lbs.
78.4%	3/8"	48"x120"		48"x120"	48"x120"	5 lbs.
	1/2"	48"x100"		48"x100"	48"x100"	6 1/2 lbs.
LUMINEX	1/4"	48"x144"		48"x144"	48"x144"	3 1/2 lbs.
82.4%						
SKYTEX	1/4"	48"x144"		48"x144"	48"x144"	3 1/2 lbs.
72.9%						
INDUSTREX	1/4"	48"x144"		48"x144"	48"x144"	3 1/2 lbs.
82.2%						
FINE-TEX	1/4"	48"x144"		48"x144"	48"x144"	3 1/2 lbs.
83%						
POLISHED WIRE Hexagonal Nuweld	1/4"		60"x144" 58"x142"			3 1/2 lbs. 3 1/2 lbs.
84.0%						

*Satinol on one surface decreases light transmission approximately 3%—both surfaces approximately 6%. Frosting decreases light transmission approximately 15 to 20%.
†Some patterns available in widths up to 60" depending upon stocks on hand, but maximum width of Frosted glass is 48" regardless of pattern.
*†Single Surface Frosting is on patterned side and maximum width is 44". Single Surface Satinol is on smooth side.



Blue Ridge Securit Glass may be used in bath rooms as a tub enclosure or shower door, like this. Securit Glass provides beauty, extra safety and minimizes breakage replacement costs.

PHYSICAL CHARACTERISTICS—As determined by laboratory tests:

Modulus of Rupture—28,800 lbs. per sq. in. of cross section.
Hardness (Mohs' Scale)—6
Thermal Endurance—400° F. differential
Safe Working Temperature (maximum)—650° F.

WARNING: Securit Glass is supplied by the Blue Ridge Glass Corp. in the actual shapes and sizes required, but it cannot be subsequently cut or ground. Cutting, puncturing the surface, or chipping the edges will cause immediate disintegration of the glass.

Chart for Specifying Blue Ridge Securit Patterned Glass

Pattern	Plain Rolled Fire Finish	Satinol 1 Surface	Maximum Size
Diffusex Pebblex Reglex Muralex	7/32"		30"x72"
Linex Louvrex Flutex	7/32"	7/32"	30"x72"
Luminex Velvex	7/32"	7/32"	30"x72"
Skytex Industrex Textured Linex Textured Flutex	7/32"		30"x 72"
Hammered Ribbed	7/32" 7/8" 1/2"		30"x 72"
Aklo (unwired) Frosted Aklo (unwired)	1/4" 1/4"		40 united inches (sum of width plus length)

For descriptions of patterns, see pages 18-21.

Note: Patterned glass 1/8" thick and Wire Glass cannot be Securitized.

Blue Ridge Securit® Patterned Glass Doors

Doors of Blue Ridge Patterned Glass add beauty to any room. They're rugged—heat tempered by the Securit process. Their reasonable price makes them practical for use in almost any type of building. They are for interior use only.

GLASS. $\frac{3}{8}$ " thick Muralex Glass patterned on both surfaces—conforms to federal specifications DD-G-451a. This glass lets in an abundance of softly diffused light and provides adequate privacy for most uses. If wider diffusion and greater obscurity are required specify Satinol finish on both surfaces. For minimum light transmission and maximum privacy specify white Ceramic Enamel coating on both surfaces.

HARDWARE. Locks, hinges and door closers for Securit Doors are available in dull bronze and brushed chrome finishes.

REVERSIBLE. Because the glass is patterned on both surfaces, this door can be used either right or left hand.

These doors cannot be cut or ground after manufacture. Order the exact size you need. Non-standard sizes can be made, but involve extra time and cost.

BEAUTY. The jewel-like, $\frac{3}{8}$ " thick patterned glass adds an exciting touch to interior decoration.



Privacy with well diffused light are two of the benefits Securit Doors offer. Keeps people from seeing in freely, but lets in light. (Architect: Selman T. Franklin)

Blue Ridge Corrugated Glass



Smartly functional are these walls of Corrugated Glass. The delicate Muralex pattern is the same as the pair of Securit Doors adding a distinctively modern look.

The Muralex pattern, so highly popular on flat Patterned Glass and on Securit Interior Glass Doors, is rolled into both surfaces of Blue Ridge Corrugated Patterned Glass. In the forming process the pattern is flattened on one side to provide a matte finish cutting surface.

Blue Ridge Corrugated Patterned Glass in walls and windows highlights the clean modern lines of today's buildings. And, it's lovely, subdued pattern creates beautiful decorative effects in remodeling older structures.

Surface Finish: Normally fire polished but can be made with Satinol finish on the heavily patterned surface to provide greater obscurity.

Contour of Corrugations: Conforms to federal specifications DD-G-451a—deep angle corrugation—2.50" pitch.

Sizes and Weights

SERIES "D"

Sizes	Code No.	Weights
2'6"x6'8"	2668D	95 lbs.
2'8"x6'8"	2868D	100 lbs.
3'0"x6'8"	3068D	110 lbs.
3'0"x7'0"	3070D	115 lbs.

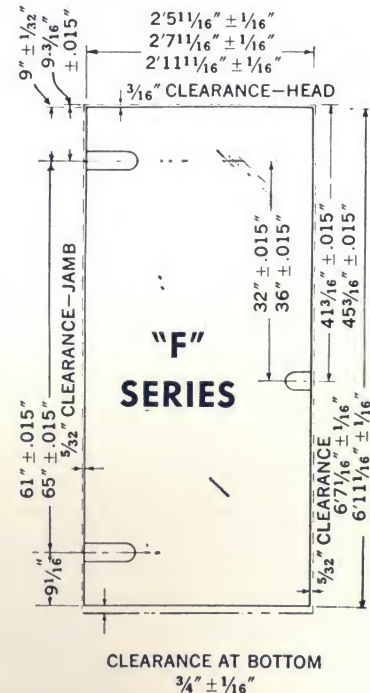
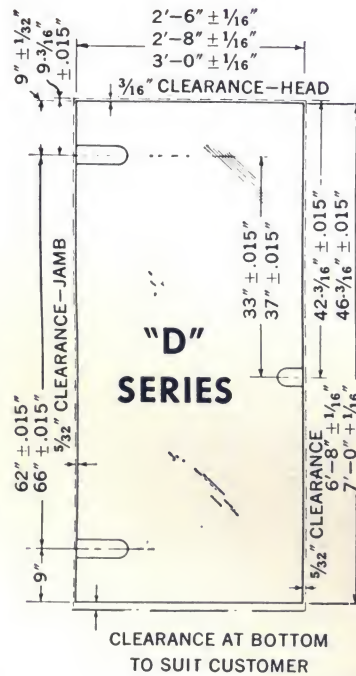
SERIES "F"

Sizes	Code No.	Weights
2' 5 1/16"x6' 7 1/16"	2668F	95 lbs.
2' 7 1/16"x6' 7 1/16"	2868F	100 lbs.
2' 11 1/16"x6' 7 1/16"	3068F	110 lbs.
2' 11 1/16"x6' 11 1/16"	3070F	115 lbs.

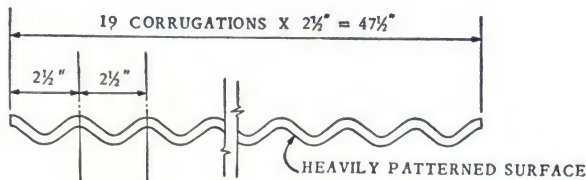
SUGGESTED SPECIFICATIONS

Where Tempered Patterned or Obscure Glass Doors for interior use are specified herein or shown on plans, they shall be 3/8" thick Securit Interior Glass Doors manufactured by Blue Ridge Glass Corporation and each door must be identified by the name SECURIT® enameled on the hinged edge of the glass. (Note: State surface finish of glass and hardware).

For more information on Securit doors see Sweet's file for architects 15d/Lib.



NOTE: If manufacturer of jamb welds nuts for hinge attachments, he must use dimensions and tolerances as shown.



Maximum Width: 47 1/2".

Maximum Length: Normally 120" but glass up to 144" long can be rolled to special order.

Glass Thickness: 3/8" plus or minus 3/64".

Over-all Thickness: 1" plus or minus 1/8".

Approximate Weight: 5.1 lbs. per sq. ft.

Cutting Information: As cutting on the centerlines of corrugations provides the best edges it is desirable to design for glass widths in multiples of 2 1/2".

Setting Metal: Precut metal framing for Blue Ridge Corrugated Patterned Glass is manufactured by O. E. Stelzer, South Bend, Indiana.



Windbreaks of Corrugated Glass enhance the modern architectural lines of this building and make a striking frame for the clear glass entrance doors. (Architect: Leland K. Cardwell, Johnson City, Tenn.)

Services

The Libbey-Owens-Ford Glass Company is one of the world's largest manufacturers of flat glass. The main office is in Toledo, Ohio. Sales offices in principal cities are listed on this page. Factories are located in Rossford, Ohio; East Toledo, Ohio; Ottawa, Ill.; Shreveport, La.; Charleston, W. Va., and Brackenridge, Pa.

Libbey-Owens-Ford Glass Company is sales agent for products manufactured by the Blue Ridge Glass Corporation, Kingsport, Tenn.

Architects, designers, construction engineers and builders will find it helpful to consult Libbey-Owens-Ford on any question pertaining to the design and installation of flat glass products. In this connection, the company maintains in Toledo three excellent facilities—research department, technical laboratory and department of design.

All Libbey-Owens-Ford and Blue Ridge products for building purposes are sold and installed by leading glass distributors and/or dealers. For additional information, contact any L-O-F office, any L-O-F glass distributor (listed in the yellow section of telephone directories), or write us direct.

LIBBEY - OWENS - FORD GLASS COMPANY
TOLEDO 3, OHIO

a Great Name in **GLASS**



DISTRICT OFFICES

Atlanta 3, Ga.	Lamar 5239
1001-1004 Whitehead Building	
223 Peachtree Street, N.E.	
Boston 16, Mass.	Hubbard 2-0100
1437 Statler Building	
20 Providence Street, Park Square	
Buffalo 3, N. Y.	Cleve. 0291
1112 Rand Building	
14 Lafayette Square	
Chicago 3, Ill.	Central 6-2490
Room 1400-1410	
120 So. LaSalle St.	
Cincinnati 2, Ohio	Main 6174
912 Enquirer Building	
617 Vine Street	
Cleveland 13, Ohio	Main 1-7180
1302 Terminal Tower Building	
Dallas 1, Texas	Riverside 4026
1402 Tower Petroleum Building	
Dayton 2, Ohio	Michigan 8315
901 Third National Building	
Denver 2, Colo.	Tabor 5-8015
414 Tramway Building	
Detroit 2, Mich.	Trinity 5-0080
610 Fisher Building	
Indianapolis 4, Ind.	Melrose 7-1363
724 Circle Tower Building	
5 East Market Street	
Kansas City 6, Mo.	Victor 5360-61
619 Dwight Building	
1004 Baltimore Street	
Los Angeles 5, Cal.	Dunkirk 8-0641
1101 Tishman Building	
3440 Wilshire Boulevard	
Memphis 3, Tenn.	37-7589
540 Sterick Building	
8 North Third Street	
Milwaukee 3, Wis.	Broadway 2-2887
5154 Plankinton Building	
161 West Wisconsin Avenue	
Minneapolis 2, Minn.	Main 8429
506 WCCO Building	
New York 16, N. Y.	Murrayhill 2-6511
99 Park Avenue	
Philadelphia, Pa.	Midway 2-8825, 2-8826
121 Coulter Ave.	2-8827
Ardmore, Pa.	
Richmond 19, Va.	3-3034
1122 Mutual Assurance Society Bldg.	
909 East Main Street	
St. Louis 1, Mo.	Central 1-9863
Ambassador Building	
411 N. 7th Street	
San Francisco 5, Cal.	Sutter 1-4360
635 Rialto Building	
116 New Montgomery Street	
Seattle 1, Wash.	Seneca 2513
210 Lloyd Building	
Sixth and Stewart Streets	
Toledo 3, Ohio	Fairfax 5781
608 Madison Ave.	
Washington 6, D. C.	Sterling 3-4472
806 Connecticut Avenue	

See the yellow pages of your
Telephone Directory for your nearest
Libbey-Owens-Ford Glass Distributor